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S. HRG. 104–532, PT. 7

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1997 AND THE FUTURE YEARS DEFENSE PROGRAM

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PT. 7
Department of Defense Authorization...

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDRED FOURTH CONGRESS

SECOND SESSION

ON

S. 1745

AUTHORIZING APPROPRIATIONS FOR FISCAL YEAR 1997 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CONSTRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF ENERGY, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL YEAR FOR THE ARMED FORCES, AND FOR OTHER PURPOSES

PART 7
STRATEGIC FORCES

MARCH 6, 13, 20, 25, 29, 1996

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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1997 AND THE FUTURE YEARS DEFENSE PROGRAM

WEDNESDAY, MARCH 6, 1996

U.S. Senate,
Subcommittee on Strategic Forces,
Committee on Armed Services,
Washington, DC.

DEPARTMENT OF ENERGY ENVIRONMENTAL MANAGEMENT PROGRAM (EM) AND DEFENSE NUCLEAR FACILITIES SAFETY BOARD (DNFSB) ACTIVITIES

The subcommittee met, pursuant to notice, at 2:03 p.m. in room SR–232A, Russell Senate Office Building, Senator Dirk Kempthorne presiding.

Committee members present: Senators Kempthorne, Thurmond, Exon, Bingaman, Glenn, and Bryan.

Committee staff members present: Romie L. Brownlee, staff director; Ann M. Mittermeyer, assistant counsel, and Christine K. Cimko, press secretary.

Professional staff members present: Gregory J. D'Alessio.

Minority staff members present: William E. Hoehn, Jr., professional staff member; and Frank Norton, professional staff member.

Staff assistants present: Shawn H. Edwards, John R. McLeod, Franklin H. Turner, and Jennifer L. Wallace.

Committee members' assistants present: Mike Matthes, assistant to Senator Warner; Glen E. Tait, assistant to Senator Kempthorne; Andrew W. Johnson, assistant to Senator Exon; Edward McGaffigan, Jr., assistant to Senator Bingaman; Christopher R. Kline, assistant to Senator Glenn; Jennifer A. Lambert, assistant to Senator Byrd; William Owens, assistant to Senator Robb; and Joe Barry and Polly Synk, assistants to Senator Bryan.

Committee members' fellows present: Maj. Marc T. Thomas, fellow to Senator Kempthorne, Linda Taylor, fellow to Senator Bingaman, Ninette Sadusky, fellow to Senator Robb, and LTC Michael W. DeYoung, fellow to Senator Bryan.

OPENING STATEMENT OF SENATOR DIRK KEMPTHORNE

Senator Kempthorne. Ladies and gentlemen, I will call this hearing to order.

Today the Strategic Forces Subcommittee meets to hear testimony on the Department of Energy's environmental management, or EM program. Unfortunately, the Congress does not have the Department's fiscal 1997 budget request at this time, so today we will focus on the activities and plans of the overall EM program since last year's hearing.

In particular, we will emphasize three major issues. First, we will try to determine whether the fiscal year 1996 level of funding is sufficient to meet the major objectives of the EM program over a reasonable period. Second, we will question whether DOE's strategy and resources are adequate in dealing with the highest program priority, which is isolating high level nuclear waste, including the spent nuclear fuel rods, and third, we want to hear about efforts to make the program more cost-effective and results-oriented, including suggestions from the witnesses about how the committee may be able to help.

Last year, the Congress provided over $5.5 billion for the EM program. While this level of funding is significant in today's budget environment, the fiscal year 1996 appropriation represented a reduction from the administration's request. Despite the best efforts of Tom Grumbly and others, there remain concerns about what results the American taxpayers are getting from their investment in the EM program.

The challenge to Secretary Grumbly and to his proposed successor Mr. Al Alm, and to this committee is to demonstrate to the rest of the Congress and the American people that real progress is being made in the EM program.

I hope each of the witnesses will be able to testify about at least a few concrete examples of significant successes over the past year, and to give the committee a preview of important milestones which you plan to meet over the next year. Unless we can show such real results and real progress, I am confident there will be increasing efforts to reduce funding for this program.

The Chairman of the Senate Armed Services Committee, Senator Strom Thurmond, and several other Senators are particularly concerned about DOE's strategy for dealing with the most difficult problem for which the EM program is responsible—the high level nuclear waste legacy of the Cold War, and the spent nuclear fuel rods which are being sent to Savannah River and Idaho, as well as those which are to be remaining at Hanford.

I believe that DOE missed an important milestone recently in its continuing attempts to characterize the contents of the high level waste tanks at Hanford. Meanwhile, Senator Thurmond has told me that in spite of the Defense Nuclear Facility Safety Board's admonitions about the importance of maintaining the Savannah River site canyons for the chemical processing mission, DOE has indicated that it prefers not to use these important tools to greatly reduce the volume of the spent nuclear fuel rods that it is forcing on the State of South Carolina, but to store them on-site indefinitely.

There is a serious concern not only about program strategy here, but also about lack of progress, and about whether the administration has failed to request sufficient resources for these most hazardous environmental situations in the complex.

These concerns notwithstanding, Secretary Grumbly, this committee stands ready to consider legislation to reduce overregulation and bureaucracy in the EM program in order to make the program more effective. That is another reason why this subcommittee will hear from a second panel of contractor officials from major EM sites.

We want to get the views and the suggestions of the folks that are on the ground across the country who are trying to address the cleanup and waste management challenges facing the Department of Energy. We must make this effort to better deal with the oversight of the EM program, especially if we want to justify this large expenditure of funds to the American taxpayer.

Secretary Grumbly, as you know, I also have a special interest in the Department's efforts to fulfill its commitments to the State of Idaho regarding cleanup activities and the eventual shipment of all spent nuclear fuel and transuranic waste out of the State by the year 2035. This is a landmark agreement that will challenge DOE to open a new chapter in meeting its commitments and delivering real results. This agreement will also require substantial funding, and I look forward to discussing these requirements with you.

The subcommittee will also hear from Mr. John Conway, Chairman of the Defense Nuclear Facilities Safety Board. The board has a proven record of addressing real problems in a factual, scientific way. We want to hear his assessment of how DOE has done since last year and what the board believes are deficiencies in DOE's safety performance and compliance with board recommendations. We want to know what needs to be done to fix such deficiencies.

At the same time, Secretary O'Leary and the recent DOE advisory committee has recommended adding a layer of external regulations on DOE nuclear activities. It is not clear to this subcommittee that this recommendation was subscribed to by the majority of the members of that DOE advisory committee, nor is it clear that DOE, in the advisory committee report, has made a case for external regulation which can stand on its own merits.

Frankly, the Secretary's 60-day task force to develop a plan for moving DOE nuclear weapons and cleanup activities without Department of Defense or congressional involvement appears to be somewhat of a rush to judgment. Because Mr. Grumbly is in charge of this DOE task force, I am sure that he will fill us in on its purpose and its status. In any case, the subcommittee expects to be a major player in this debate.

The subcommittee also wants to hear about the expected costs and benefits of this proposal, and alternatives. The subcommittee would also like to hear Mr. Conway's views regarding whether there are benefits to additional regulation, whether he thinks there is an alternate approach to cost-effectively enhancing nuclear safety, and what role the board may play in this effort.

In short, we have a lot of issues to discuss at this hearing today, so based on the magnitude of these issues, I think it is very opportune for us to roll up our sleeves and have a good session.

With that, I want to turn now to the distinguished Ranking Member of this subcommittee and truly a great friend of mine, Senator Jim Exon of Nebraska.

Senator EXON. Mr. Chairman, thank you so very much for your excellent opening statement and the comments that you just made.

It is true that I have been involved in these matters for a long, long time. The hearing today is a continuation of questions that we are asking, and not to be critical, but to make sure we are doing everything we should be doing in this very, very important area in the United States, and when I say the United States, I am concerned about what is going on here, and I am also very much concerned about what I am convinced is less than a realistic look at this problem in the Soviet Union, the other nation that has these problems as a result of the Cold War.

I look forward to working with you again, Mr. Chairman. Thank you for your good efforts last year. We had a true bipartisan working relationship. I think that will continue again, and I have acknowledged previously and wish to acknowledge again today the great contribution that you have made to this particular area since you became a Member of the United States Senate. It has been a joy working with you.

Senator KEMPTHORNE. Thank you, Senator.

Senator EXON. I join you, Mr. Chairman, in welcoming Mr. Grumbly and Mr. Conway to this meeting, two experts I have a great deal of confidence in. I want to thank them for their past services in this area, and thank you for being here today to brief us on how things are going.

Certainly, I happen to feel that Mr. Grumbly, and certainly Mr. Conway, have been very forthcoming in every instance of every meeting that I have had as well as in all my personal discussions with them, and certainly the committee is here today to get your input, your advice, and your assurances, as best you can give them to us, with regard to the problem that still remains outstanding.

Mr. Grumbly, you have done an outstanding job over the past several years as assistant Secretary for Environmental Management Issues. This has at times been a thankless job, I am sure, so we need to express our thanks to you for your untiring efforts, and certainly wish you well in your new assignment in the Department of Energy.

The same comments can be made about Mr. Conway. Mr. Conway has served unselfishly on the board for a long, long time and has been before the committee on many occasions.

Mr. Chairman, I recall at last year's DOE hearing both Secretary O'Leary and Mr. Grumbly asserted that the DOE was, I think in their words, "turning the corner" in the environmental management area. On that basis, I suggested we approve the environmental management request virtually intact, and left the balances that were on hand untouched.

Thus, Mr. Chairman, the main issue for this subcommittee in my view this year is what evidence is there, a year later, that shows that we have been successful in "turning the corner"?

I want very much to believe we have, indeed, turned the corner. I want to learn that the EM funds are actually being used to clean up sites rather than paying lawyers' bills. The latter does little good, in my view, with regard to addressing the problem.

I want to be assured that the new technologies are developments that will cut the cost of the cleanup program and move it expeditiously along. I want to be assured that we have acceptable timetables, and that the DOE will not be relentlessly sued for failure to meet its legal obligations.

In sum, Mr. Chairman, I want to be convinced that we really have turned the corner on the cleanup. I hope we have. If we have, God's speed.

I look forward to the testimony, Mr. Chairman.

Senator KEMPTHORNE. Senator Exon, thank you very much. I appreciate and agree with what you said this afternoon.

Also, Chairman Thurmond will be joining us momentarily, and would like to make a few comments, but at this point let me just see if other members of the subcommittee would like to make any opening comments.

Senator Bingaman.

Senator BINGAMAN. Mr. Chairman, I would just like to dissociate myself from all those antilawyer comments that were just made. [Laughter.]

Otherwise, I welcome the witnesses, and appreciate you having the hearing.

Senator KEMPTHORNE. Thank you, and thank you for being here. Senator Glenn.

Senator GLENN. I just came in. I did not hear Senator Exon's comments, but I associate myself with his remarks. [Laughter.]

I will keep this short. I want to point out some strong concerns, however, with the subcommittee moving ahead with this hearing without the benefit of DOE's budget. I have never heard of that around here, going ahead with the hearings on the budget without knowing what the budget is. I do not know how we can evaluate the 1997 request when it has not been submitted to us yet, so I hope they can get that in right away.

I appreciate the tight schedule as we move through this authorization bill, but I want to make sure we have the basic information before we make our decisions, and we do not really have all that available to us here yet. I do not want us to lose sight of some fundamental obligations, namely our commitment to clean up and make safe the sites in the former production complex.

This whole thing started with some of our GAO studies back in 1985, as everyone is aware. Both of you are aware of the history of this thing, so I will not go through that, and one GAO study after another, all around the whole complex, and the cost has gone up and up and up, and I thought we should be up around $8 billion to $10 billion a year if we are going to do justice to this and expect to really get it under control over a 20- or 25-year period, which are some of the estimates, I think. I do not think we can get by on the cheap with this and just ignore it. It just gets more expensive the longer we go, so I am concerned about that.

Nobody expected it would be easy or cheap, and just as we are starting to get our hands around some of the problems, we hear some of the naysayers who apparently intend to walk away from the cleanup. I do not see how we can do that and exempt these sites from environmental laws or cut funding drastically. I think that is precisely the wrong approach, and something I would fight strongly.

We also cannot go up and down in the budget every year. You just waste money when you do that. The long-term cleanup cannot be turned on 1 year and off the next and back on the third.

I want to make a special welcome to John Conway, head of the Defense Nuclear Facilities Safety Board, who is with us today. The board was developed in part as a result of legislation I introduced way back in 1987, and I am eager to hear of your independent assessment of the safety hazards which face DOE workers and the public.

I also want to welcome Don Ofte, who is the outgoing president of FERMCO, the contractor performing the Fernald cleanup. I believe that much progress has happened at Fernald in the last 2 years, and I am anxious to hear Mr. Ofte's perspective on it as well.

Thank you, Mr. Chairman.

Senator KEMPTHORNE. Thank you, Senator Glenn.

Senator Thurmond.

Chairman THURMOND. Thank you, Mr. Chairman. I will not be here but for just a minute. I want to congratulate you, Mr. Chairman, for the great work you have done in this type of work on the Armed Services Committee. You have done a magnificent job, and we are proud of it.

Senator KEMPTHORNE. Thank you.

Chairman THURMOND. I just have two questions I would like to ask Mr. Grumbly.

Mr. Grumbly, DOE is about to open a major revitrification facility at the Savannah River facility to isolate high level nuclear waste. Does it not make sense to attempt to reduce the foreign fuel rods being sent to the site by chemical processing in the canyon facilities and then vitrify the residue in this major new facility?

STATEMENT OF THOMAS P. GRUMBLY, ASSISTANT SECRETARY FOR ENVIRONMENTAL MANAGEMENT, DEPARTMENT OF ENERGY

Mr. GRUMBLY. Mr. Chairman, I think we have the responsibility to see if we can develop several new technologies over the next years so that we will not have to dry store this material, and if we cannot do that in a timely fashion, then I think we will have to see whether we are going to put this stuff through the processing canyons.

Chairman THURMOND. Mr. Grumbly, the Defense Nuclear Facilities Safety Board has emphasized the need to keep both Savannah River canyons in a high state of operational and safety readiness for future missions. Do you agree or disagree with the board?

Mr. GRUMBLY. I agree we need to keep both canyons in a high state of readiness, but I think we need to examine whether we can utilize in the near term only one canyon, the F canyon, so that we can maximize the effectiveness of the workforce that we have down there and reduce the costs of running the Savannah River site, but I agree we should keep both places in a high state of readiness.

Chairman THURMOND. Thank you. Thank you, Mr. Chairman.

Senator KEMPTHORNE. Mr. Chairman, thank you very much, and thank you for your kind opening comments. We always have time for those. Senator Bryan.

Senator BRYAN. Thank you, Mr. Chairman. Let me just briefly register a concern, and when my time comes for questions, I can explore that.

My concern is with the volume of shipments that are contemplated that would come out of these various facilities. Under one projection that is part of the environmental impact statement the Nevada test site over a 10-year period of time would receive 6,780 of these shipments, of what is listed as either low level waste or mixed waste, it would appear from the documents.

That is an enormous volume. As you might imagine, there are concerns with transport, shipment, with all of the inherent problems.

The last month, being February of 1996, will not go down in history as national rail safety month. As you know, we had a tragedy here not too far from the Nation's capital. Eleven people were killed. Every 4 days there was a major derailment of some kind.

So I have some concerns about that, and I see here, under an expanded use option that may be contemplated, some 25,084 shipments over a 10-year period. I just want to note for the record, Mr. Chairman, my concern, because those are all targeted to come to the Nevada test site, just about 60 miles, or 70 at the outside, from a metropolitan area, over a million people in Las Vegas.

Thank you very much.

Senator KEMPTHORNE. Thank you very much.

Senator EXON. Mr. Chairman, just let the record show that at the present time there are two lawyers in this room, and there are three of us that are not. I would simply say that that is about the right ratio. I would suggest if one more lawyer walks into this room, this hearing be delayed to some future time where we have a fair representation.

Senator GLENN. Do you want to call for a vote?

Senator EXON. I demand a vote. [Laughter.]

Senator KEMPTHORNE. I like this Senator. He is a good man, plain speaking.

With that, Mr. Grumbly, let me again welcome you. We look forward to your comments, and Tom, I would just say, also, that on your pending nomination, which is a promotion within the Department, I wholeheartedly support that. You have performed in an outstanding fashion. You are pragmatic, and I appreciate working with you, and I mean that with all sincerity.

So I look forward to your comments.

Mr. GRUMBLY. Thank you very much, Mr. Chairman.

Speaking as a nonlawyer, I have a lengthy statement to put in the record which I will not deliver, and I hope you will include the entire thing in the record.

Senator KEMPTHORNE. Without objection.

Mr. GRUMBLY. I appreciate very much, obviously, the opportunity to appear before you to discuss the DOE's environmental management program.

Last year, it is true, Senator Exon, I appeared before you to say that the environmental management program had "turned the corner," and this year I am pleased to report that we are well on our way down the road toward reducing risks and finishing cleanups. Make no mistake, this program cannot be abbreviated or artificially reduced. Our responsibilities must be met, and our sites cleaned up. This will take decades, but we have moved out of the garage, and we are getting into gear in this program.

As Senator Glenn indicated, I cannot yet report to you in detail about the fiscal year 1997 budget request because the President's budget will not be submitted in detail until March 18. I can, however, give you a sense of what we expect the overall budget to be, our commitments for fiscal year 1997, and our progress for the last year, despite a very tight budget year, and I might add that it is clear that the years in the future are going to be even tighter for all nondiscretionary, non-DOD defense spending, and we expect that our budget request for fiscal year 1997 will be adequate for our environmental compliance requirements pursuant to executive order 12088.

The budget request will be slightly less than what was enacted last year by the Congress, and a bit greater than the budget that was passed by the House of Representative last year. The total available will still be in the range of about $6 billion, and the defense requests that we will be making will be in the range of $5.4 billion, which is about $75 to $100 million less than last year.

While we are getting results, I need to add a note of caution. To continue making progress and not merely maintain the status quo, Congress this year must enact the President's budget. We need a predictable, stable budget baseline, and we cannot afford to continue to take 10 percent reductions, as we did last year, off of the President's budget request.

I might add that this committee did an absolutely outstanding job, as did the entire United States Senate, in supporting our budget proposal last year, and I hope that we will be able to say the same this year and that we will be able to persuade you that we, in fact have a good case.

Let me talk to you about our progress first in accelerating cleanup and in cutting bureaucracy in this program. We manage the largest environmental stewardship program in the world. Our facilities are located in more than a dozen States, and cover more than 1,000 square miles. We inherited a legacy from the former nuclear weapons complex of unprecedented volumes of contaminated soil and water, unique radiological hazards from special nuclear materials, and a vast number of contaminated structures ranging from chemical plants to evaporation ponds.

We are responsible for more than 25 metric tons of plutonium, which pose extraordinary safety and security concerns, and we are the landlord of numerous sites around the country, some of them essentially small cities.

Last year, we estimated the cost for stabilizing and cleaning up these facilities to be approximately $200 billion in today's dollars over a 75-year period. We are currently revising that estimate. It will be available in May, and the preliminary results indicate a somewhat lower but not dramatically different prediction than the first estimate, based upon bottom-up results that we are getting. We are using these results to help drive down the life cycle cost of the program.

Regardless of the final tally, the challenges and potential costs of this program are immense. We must pay serious attention to the technologies and business methods necessary to ensure that the job is done in as modest and most cost-effective manner possible.

We are paying attention, and we are getting results in several areas. We are getting results that reduce urgent risks. We are eliminating urgent risks posed by unstable plutonium, high level waste tanks, and corroded spent fuel and targets.

For example, the Savannah River site defense waste processing facility, the largest high level nuclear waste vitrification facility in the world, is ready for startup and will commence operations next week.

At the Savannah River site, we also restarted the F canyon, and it stabilized over 20 percent of the liquid plutonium nitrate solutions that pose a threat of criticality or leakage if left unaddressed, and we have also started dissolution operation and begun dissolving and reprocessing various spent fuel targets, which are among our most corroded materials, some having been in storage for decades.

We responded to congressional concern about how we address risks by issuing a report, Risks and the Risk Debate, Searching for Common Ground.

We then used this report as a step to integrate information about risks to public health, worker safety, and the environment into our budget formulation and, when you see our budget in detail this year, you will see that it is primarily driven by risk.

We are also getting results by doing more work with less money. We are contributing to a leaner Federal Government by operating on a fiscal year 1996 budget which was less than that which we had for fiscal year 1995, given a comparable scope of work.

We took over $840 million worth of responsibilities from the Department's Office of Defense Programs last year, including most of the Savannah River site, and we are getting the job done with a constant dollar base that is lower than it has been in previous years. In other words, more work, less money.

We are getting results spending more in cleanup and less on study. We have passed the point in this program when most of our effort went for legally mandated assessments and studies. We are now devoting most of our money to on-the-ground results.

In the last fiscal year, we have increased our cleanup funding, the actual on-the-ground funding, by almost 20 percent, and lowered our spending on assessments by 20 percent. By fiscal year 1997, we will have further increased what we spend on cleanup by 35 percent, compared to fiscal year 1995, and further decreased what we will spend on assessments by almost 60 percent.

Some of the most dramatic results we have achieved have been at the Fernald Ohio site. Starting in fiscal year 1995, over a 3-year period we expect to drive down our study costs by 73 percent while increasing our funding for on-the-ground cleanup by 57 percent. In other words, we have lower sums of money, but we are dramatically spending more money in actually taking buildings down, cleaning up groundwater, making things happen.

We have changed and streamlined the way characterization studies and site assessments are handled in our contracts so that emphasis is placed on doing actual work and not simply studying the problem. We have completed 119 interim actions, 75 larger scale cleanups, and 17 decommissioning actions, resulting in over 5 million cubic yards of mill tailings, soil, and rubble stabilized, contained, or otherwise addressed.

The Department completed action on 1,225 individual release sites and 25 facilities in fiscal year 1995, bringing the total to nearly 30 percent of all the sites that we have to complete. We will complete an additional 892 interim and remedial actions by the end of fiscal year 1997. I want to emphasize the percentage completion that we have. These are not just small sites. We are now moving into the large sites as well in doing this.

We are getting results by the way we do business. One of the most significant achievements has been the imposition of real budgetary and bureaucratic discipline on this program. From the creation in 1989, the budget for this office grew exponentially and, frankly, a lot of people thought the costs were out of control.

By the time I took this job in 1993, the program was in real need of financial restraint, and beginning that year we made cost reduction one of the highest priorities. Contracting and management reforms and how we set priorities have reduced costs, sped up the pace of work, and improved how we get the job done, and I hope and I know that you will find out from our contractors this afternoon exactly what we are doing in these areas.

As I mentioned, we have reduced the budget in real terms, despite having added responsibility. We have cut our contractor workforce substantially, a painful but necessary exercise if we are going to do the work we need to have done.

Our contract reforms have also been vital in making the transition from a Cold War production system to the new missions at many of these sites. Today's imperatives are efficiency, progress, and accountability, not production at any cost.

Our new contractors reward contractor performance. Performance is measured through cost control, safety, and real, on-the-ground results. We are competing and saving on our for-profit contracts at all of our major sites. Contractors have pledged savings of approximately $2 billion in the first two competitively awarded procurements alone, those at the National Engineering Laboratory and the Rocky Flats Environmental Technology Site.

We are also privatizing work where appropriate, and I emphasize where appropriate and effective. For example, by privatizing the sanitary waste disposal activities at our Savannah River site, we save $34 million by eliminating the need to construct a new facility. At our Hanford site, we reduced financial, administrative, and information management functions, which have allowed a savings of nearly $60 million. These are real and significant, and are indicative of the expectations we have for the future, and demonstrate how far we have come.

Finally, through well-received efforts imported from the corporate community, what we call work-out sessions, where we assemble regulators, contractors, the Department, and all of the necessary information, including our colleagues at the Defense Nuclear Facilities Safety Board, particularly at Rocky Flats, we are wringing out as much savings as possible by addressing each perceived stumbling block to progress.

The first of these work-outs focused on the Hanford site, and was heralded by all sides—the State of Washington, the EPA, contractors, site management, as well as our own management—as a major breakthrough.

At the Savannah River site, the work-out produced substantial improvements in operations that can be plowed back into the site to the tune of nearly $130 million.

We are also getting results by developing technologies. Some of the environmental health and safety risks present at our sites simply do not have solutions with today's technologies, or today's solutions would cost too much. Over the past 2 years, we have made available for transfer, for implementation, 48 new or improved technologies.

A comprehensive review of 15 of these technologies reveals that, depending upon the degree of cleanup, we have saved as little as $9 billion but perhaps as much as $80 billion off the baseline that I articulated through the use of just 15 processes alone.

We have also, primarily at the request or on the recommendation of the Galvin Report, and last year you might remember, Senator, that you had Mr. Galvin and his colleagues here at this hearing, we have substantially increased our investment in science and technology, with a $50 million new basic science initiative and a new spent fuel technology development program, which is centered at both the Savannah River site and the Idaho River National Engineering Laboratory.

Having made these investments, we are confident that the work we do in stabilizing the sites will buy us the time to implement new, more cost-effective remedial technologies in the future.

We are also getting results through working with States, Federal agencies, regulators, tribes, citizens' groups, and unions. The recent unprecedented agreement negotiated between the Department of Energy, the State of Idaho, and the Department of the Navy, regarding spent fuel and radioactive waste issues at the Idaho National Engineering Laboratory has succeeded, I think, in positively redefining Federal and State relations.

The solution comprehensively addresses national security, future environmental protection, and public funding concerns, and we particularly appreciate the sense of Congress resolution that came out of this committee supporting this agreement that was included this year in the Defense Authorization Act.

Similarly, working closely with the unions at the Mound site in Ohio, we recently took a bold step to achieve a win-win approach to cost-cutting at that site. A path-breaking labor agreement there provides a new model for site cleanup and closing issues which will simultaneously increase productivity and workforce stability.

Citizen participation in our decisionmaking has proved both economical and effective. Working with the Department, the Fernald Citizens Task Force examined and analyzed conditions at that plant, which is comparable in size to the Ford Motor Company's River Rouge Plant, and they concluded that different parts of the site would be suitable for different future uses. The recommendations from this collaborative process will save over $2 billion in completing the cleanup, and an estimated, $2 billion in costs over the life of the project.

It is a very profitable return on investment, and I might say parenthetically, one of the recommendations of that task force, Senator Bryan, is that less stuff be taken to Nevada, rather than more.

A little bit about next steps in the environmental management program, and then I conclude, I apologize for taking more time.

Senator KEMPTHORNE. We are doing just fine. We have plenty of time.

Mr. GRUMBLY. With new contracts, leaner site infrastructures, and effective technologies in place, I think we are poised to make substantial progress in fiscal year 1997. In my written testimony there is a complete set for your use of the commitments we will be making with this budget that goes State by State and program by program. We are willing to be measured by this committee and the rest of the Congress against our commitments.

Reducing urgent risks from unstable plutonium, corroding spent fuel and targets, and high level waste tanks will remain and will continue to be our highest priority. At our Savannah River site we will produce 150 canisters of vitrified high level waste from the defense waste processing facility. We will retire four high level waste tanks from service and complete stabilization of 3,500 gallons of high risk plutonium 242 solution stored in the H canyon.

At Idaho, we will complete the transfer of 627 spent nuclear fuel elements to safer storage areas. At Hanford, we will continue stabilizing the plutonium finishing plant materials according to the Defense Nuclear Safety Board's recommendation, 94–1.

And I might add, because I know you are going to ask, that this particular recommendation of the defense board, called in the lingo 94–1, has proven to be probably one of the most effective priority setting mechanisms that I have seen in the time that I have been here. The defense board's recommendations are ones that we take as though they were regulators, but we are able to take recommendations like that as though we are working in a cooperative atmosphere to actually drive down real risks at the sites.

We will continue to get more cleanup results under this budget. At the Idaho National Engineering Laboratory Pit-9, an innovative and cost-effective approach to remediation of a waste disposal pit, we will complete construction of the retrieval and treatment facilities. We will perform a limited production test of operational systems and start retrieving and treating the contents of this pit.

We will complete 10 expedited cleanups of the Los Alamos National Laboratory in New Mexico, and at Hanford we will excavate and remove over 100,000 cubic yards of contaminated soil in the reactor areas.

We will continue to use technology to solve our problems. For example, at Hanford we will complete a large-scale demonstration for safe storage, or the cocooning of the Hanford C production reactor.

To conclude, while we have much to be pleased about I think, in the environmental management program, we know that we have to be in this job for the long haul. Over the last 3 years, we have begun, and I emphasize begun, to change the way in which this enormous infrastructure has operated. We have realigned workforces, modified multiyear and multibillion dollar contracts, and imposed strict discipline on administrative procedures.

We recognize the imperatives of maximizing efficiency and cutting costs wherever we can, but it is critical, however, to recognize that, although we can economize and increase efficiency, there is a point beyond which further reductions in our budget means less work, and less work in this area means increased risks to the public health, workers, and the environment.

The results from the changes we have made are beginning to arrive, and will, with a stable budget, continue to grow for the next several years. I ask for this committee's full support for our budget request to continue our progress in this vital program.

Thank you for your time, and I look forward to answering your questions.

[The statement of Mr. Grumbly follows:]

PREPARED STATEMENT BY THOMAS P. GRUMBLY

Mr. Chairman and Members of the Subcommittee, I appreciate this opportunity to appear before you to discuss the Department of Energy's Environmental Management (EM) program. Last year, I appeared before you to say that we had "turned the corner" on addressing the legacy left behind by 50 years of nuclear weapons production. This year I am pleased to report real results—not only results "on the ground"—but also in a new way of doing business. Clearly, we still have a long way to go; but, we are on our way.

I cannot yet report to you in detail about our fiscal year 1997 budget request, because the President's budget will not be submitted until March 18. I can, however, give you a sense of where we expect the overall budget to be, and a description of our program for fiscal year 1997, our progress for the last year, and our long term plans. Despite a very tight budget year, we expect that our budget request for fiscal year 1997 will be adequate for our environmental compliance requirements, pursuant to Executive Order 12088. Maintenance of the level contained in the President's budget is necessary to continue making progress and not merely to maintain a status quo.

Today I would like to describe the Environmental Management program, lay out some of the significant accomplishments we have made over the past few years, review our commitments for our fiscal year 1997 budget, and outline the strategy and vision for the future of this program and its mission.

INTRODUCTION

As this Subcommittee knows, the industrial infrastructure used for producing and maintaining our nation's nuclear weapons deterrent is massive. Factories, laboratories, and thousands of square miles of land were devoted to the successful enterprise of producing tens of thousands of nuclear weapons in the name of national security. This enormous infrastructure still exists and is largely being maintained and decommissioned by the Environmental Management program.

It is difficult to communicate the size and variety of the tasks being addressed by the Environmental Management program. A map of the facilities for which the Environmental Management program is now responsible includes the basic facilities used for weapons material production—the Savannah River Site, Hanford Site, the Rocky Flats Environmental Technology Site—as well as numerous smaller facilities: Tonawanda, Fernald, and old uranium mill tailings sites. Like most industrial efforts, the nuclear weapons complex generated waste. The problems posed by the weapons complex, however, are unique as they include unprecedented volumes of contaminated soil and water, radiological hazards from special nuclear materials, and a vast number of contaminated structures ranging from chemical plants to evaporation ponds. Also, the business practices used during production of nuclear weapons are no longer appropriate.

Last year, we estimated the cost for stabilizing and cleaning up these facilities to be approximately $200 billion. We are now completing a more detailed update of that estimate, which should be completed in May 1996. The preliminary results indicate a somewhat lower, but not dramatically different, projection than the first estimate. We are using these results to help drive down the life-cycle costs of the program. Regardless of the specific details, it is clear that it is the largest environmental stewardship program in the world. It is also clear that this challenge warrants serious attention to the technologies and business methods necessary to ensure that the job is done in the smartest and most cost-effective manner possible.

As a result of the abrupt cessation of new nuclear weapons production operations in the late 1980's, we not only have inherited a legacy of thousands of contaminated areas and buildings, and huge waste volumes, but we also have responsibility for large amounts of nuclear materials still "in the pipeline" of their production processes. For example, the program stores more than 25 metric tons of plutonium, which pose extraordinary safety and security obligations. This quantity of plutonium is sufficient to fabricate thousands of nuclear weapons, so the security as well as the safety of this material is of paramount importance. Moreover, plutonium can spontaneously ignite in contact with moist air in certain circumstances, thereby requiring careful attention to handling and storage safety. We believe that our primary job is to address these most immediate, urgent risks to human health and the environment as well as manage the long-term contamination and safety threats, reducing the long-term mortgage passed on to others.

We are the "landlord" of numerous large sites around the country, some of them essentially small cities. This means that roads, electrical power, food services for employees, fire and emergency services—everything that it takes to safely and efficiently manage these sites—are our responsibility.

The Environmental Management program manages risks and addresses issues such as:

- hundreds of large, underground high-level radioactive waste tanks, some of which have leaked, and some of which may pose a danger of an explosion unless managed;
- the need for security to prevent theft or diversion of nuclear weapons material (e.g., plutonium and highly enriched uranium) and sabotage of nuclear facilities;
- vast quantities of surplus nuclear weapons material which need to be stabilized since they pose a risk to the public, our workers and the environment in their current state;
- thousands of metric tons of highly radioactive spent nuclear fuel, some corroding in various types of storage;
- thousands of radioactively contaminated buildings that must be stabilized and eventually decontaminated;
- contaminated drinking water, soils, and surface water;
- the potential for worker exposure to radiation and chemicals; and
- the need to safely transport large amounts of hazardous materials, onsite or between sites.

Establishing priorities among such diverse risks and complex requirements has proven to be a major managerial challenge. We are proud of our accomplishments in this area. In budget terms, this means that funding is required simply to prevent the occurrence of further problems. Additional funding is required to further eliminate the source of potential risks—the untreated wastes and nuclear materials. All of this work does not occur in a regulatory vacuum. As a Federal entity, we have significant legal and regulatory obligations. In addition to Federal and State environmental and safety laws and regulations, this program operates within a complicated framework of other commitments and expectations, which include the following:

- Defense Nuclear Facilities Safety Board Recommendations;
- Worker safety and health protection expectations derived from nuclear industry practices and Departmental orders;
- Short- and long-term technology development needs; International Atomic Energy Agency nuclear nonproliferation safeguards requirements;
- Compliance agreements or court orders; and
- Worker and community transition needs (e.g., training and land reuse).

Finding cost-effective ways to address these issues now rather than deferring solutions to later generations has been the goal of Congress and this program. The Environmental Management program is committed to, and is increasingly successful in, cost-effectively addressing the environmental and safety problems of the Cold War legacy. Last year, the Department contributed to a leaner Federal Government by submitting a budget that represented a reduction from the previous year, given a comparable scope of work. We are now operating on a fiscal year 1996 budget that is less, in nominal terms, than fiscal year 1995, despite a major expansion of responsibilities that included the Savannah River Site. In other words, more work, less money. While it has not been easy, we can honestly report tangible results from our efforts.

PROGRESS IN ACCELERATING CLEANUP AND CUTTING BUREAUCRACY

This program, like many Government programs, has had its share of startup problems. Not created from whole cloth but assembled from ongoing duties and budgets of existing Department of Energy programs, the Environmental Management program was initially ill-equipped to handle its tasks. The Environmental Management program has grown since its creation in 1989, largely through the addition of responsibility for newly declared surplus facilities. In 1989, the Program assumed full responsibility for Fernald. Soon Hanford, and the Idaho National Engineering Laboratory, were added to the program. In 1993, the Rocky Flats Plant was added. Last year the Mound Site, the Pinellas Plant, and most of the Savannah River Site were added to the overall management responsibilities of the Environmental Management program. Now, the facilities under program's purview are located in more than a dozen States and cover more than a thousand square miles. Start-up pains are no longer an acceptable excuse for management shortcomings. In 1993, the Environmental Management program established six strategic goals both to guide our efforts and to serve as yardsticks for measuring progress.

The six goals are:

- to eliminate and manage urgent risks;
- to assure worker safety;
- to establish managerial and financial control;
- to demonstrate tangible results;
- to focus technology development to get results; and
- to establish a stronger partnership through greater public involvement in Departmental decisions.

These goals that I established when I arrived, have brought tangible results, including shedding the inappropriate contracting and operating practices of the past and cutting unnecessary overhead and getting real results in reducing risks. Since October 1993, we reduced the number of contract employees by 20,000 to better fit our workforce with the mission and reflect our budget levels.

Let me report to you some specific examples of meeting goals.

GOAL 1: Reduce Urgent Risks

In 1993, we identified three urgent risks that existed at several sites: unstable plutonium, high level waste tanks, and corroded spent nuclear fuel and targets. Each of these was very serious and could have resulted in a catastrophic accident or serious worker injury without focused attention. We have succeeded in eliminating, or taken the initial steps toward elimination of, each of these urgent risks.

- The Savannah River Site Defense Waste Processing Facility—the largest high level nuclear waste vitrification facility in the world—is ready for startup upon review and approval by Secretary O'Leary of the final safety reviews. The operations readiness review was completed on Friday, March 1, 1996, and we expect to start operations soon.
- At the Savannah River Site, we restarted the F-canyon and have stabilized over 20 percent of the liquid plutonium nitrate solutions, which posed a threat of a criticality or leakage if left unaddressed.
- Also at the Savannah River Site, we restarted the PUREX dissolution operation and began dissolving and reprocessing the Mark 31 targets, which are among the most corroded materials in storage, some for decades.
- At the Hanford Site in Washington, we have virtually eliminated the risk of a tank explosion from the buildup of flammable gases by installing a state of the art pump, which has exceeded design expectations in its first 2 years of operation.
- Risks from the unknown are almost as great as the risks we do know about from these liquid high-level waste tanks at Hanford. We have made substantial progress toward characterizing the waste in these tanks, which are much less well known than the waste in the tanks at the Savannah River Site. Characterizing the waste is necessary before treating it. Recently, some have criticized the Department for not meeting our characterization goals. What many of our critics fail to understand, however, is that this operation involves cutting-edge science and engineering, and is extremely hazardous in an area with little room for error. I will not sacrifice worker safety to meet artificial quotas. Nonetheless, I am happy to report that after completing our initial learning and technology development experience, we are making much more rapid progress toward the complete characterization of these tanks.
- We have made substantial progress at Rocky Flats towards stabilizing the unstable plutonium that has been stored in glove boxes since production

shut down in 1989. For example, workers have treated approximately 26 kilograms of unstable plutonium metal and oxides in a controlled oxidation furnace, which creates a stable form for interim storage awaiting final disposition. Only five additional kilograms remain to be stabilized.

- Also, at Rocky Flats, we have stabilized approximately 1,900 liters out of 31,000 liters of plutonium solutions. To eliminate the generation of flammable hydrogen and to remove organic compounds which could become flammable, workers have safely repackaged 221 plutonium metal units that were in contact with plastic and are currently in the process of repackaging approximately 1,600 units that are in proximity to plastic.
- At Hanford, we have developed and begun using two new technologies to stabilize plutonium materials more quickly and less expensively than with traditional processing methods. We have completed the stabilization of reactive plutonium scrap and incinerator ash.
- We have completed the venting/repackaging of Plutonium-238 solids at the Savannah River Site as recommended in the Department's Plutonium Vulnerability Study.
- In compliance with a consent order to the State of Idaho, the second lot of 189 spent fuel units were transferred from inadequate storage facilities to ones meeting current safety standards.
- More than 2,060 residue drums were vented to eliminate pressure build up and flammable hydrogen accumulation at Rocky Flats.

Vulnerability assessments led by the Office of Environment, Safety and Health identified weaknesses in the way we handle spent fuel, plutonium and hazardous chemicals that could affect the public or worker health or the environment. Overall, 281 of 503 corrective actions identified in the spent fuel report have been completed and 64 of 152 plutonium milestones have been met. For example, at the Hanford K-basins, actions were developed and will soon be implemented to remediate what were identified as the highest spent fuel risks in the complex.

The Office of Environment, Safety and Health independent oversight program has also been extremely useful in effectively targeting risk. The comprehensive assessments have provided DOE management with validated, professional appraisals of the site's performance, greatly aiding our ability to target resources to areas of greatest risk to workers, the public, and the environment. The foundation of the new approach is an analytic framework or "template" that clearly articulates the principles and operational elements of sound Environment, Safety and Health management programs. The assessments have identified where we are doing well, where we have to work harder, and also aid in spreading good practices among our sites.

GOAL 2: Emphasize Health and Safety for Workers and the Public

A condition of working to protect public health and the environment is the added need to protect of the safety of our workers. It would be unacceptable to sacrifice worker health and safety in an effort to protect the public health and the environment for future generations. Our workers face risks unlike any others in this country, and we owe them—many of whom are also veterans of the Cold War—a large debt of gratitude. Recognizing the critical role site workers play in our success, we have refocused efforts to ensure their safety. Three years ago, the rate of lost work days was about 59 per 200,000 person-hours in Environmental Management operations. Today, we have cut that figure by 45 percent. This means not only fewer individuals injured or killed, but also a more productive working environment. By focusing managers and training workers, as well as discarding duplicative and cumbersome orders, we have been able to get more work done in a safer manner.

The Office of Environmental Management has partnered with the Office of Environment, Safety and Health (EH) to provide line program managers with tools to manage safety at our facilities more effectively and at less cost to taxpayers. Through several joint projects, we have shown that we can do our work better, more safely, and at less cost by integrating safety into the planning and execution of our work. We view safety as an asset that allows us to target our most urgent risks, use our limited resources most efficiently, and do our work most effectively.

Our work with the Office of Environment, Safety and Health is providing us with new tools for doing work, and doing it safely and cost-effectively. At Fernald, for example, we avoided nearly $2 million in costs by recognizing and avoiding unnecessary work. This was because safety personnel worked side by side with engineers, planners, and other workers to "build in" safety and health concerns into the actual planning of work. In much the same way, we saved $500,000 through early identification and control of hazards at a Hanford plant. We expect this approach to become standard practice throughout the DOE complex and continue to save money while also making work safer.

Many of our facilities are no longer compatible with the Department's rules and orders. These "top down" orders were developed to meet the needs of a stable weapons production system. Decontamination, decommissioning, and environmental cleanup, on the other hand, involve hundreds of individual tasks in aging facilities with hazards that are unknown and difficult to predict. A new process—"Necessary and Sufficient Process"—provides a graded approach to safety standards that allows us to tailor the standards to the work and the facilities. In a pilot application of this process at a major Hanford facility, we were able to greatly reduce worker exposure while cutting costs by 50 percent. We hope to use this process to proceed with safe and timely stabilization of facilities at Rocky Flats and other locations throughout the DOE complex.

We are meeting our worker safety goals. For example, the Environmental Management program received an award in 1995 from the State of Ohio for 2 million person hours worked without a lost time accident at Fernald. At the Savannah River Site recorded 9.5 million hours without a lost work day due to an on-the-job injury. At Hanford, we completed removal and disposal of highly irradiated reactor fuel spacers from underground silos to reduce exposures to deactivation workers at N area. Recently, however, we were soberly reminded that there is more progress to be made in this area. At the Idaho site, a worker died from a fall from construction scaffolding. These tragedies must motivate us to redouble our efforts to protect workers at our sites.

GOAL 3: Bring the Program into Managerial and Financial Control

One of the most significant achievements of the Office of Environmental Management is to have brought more budgetary and bureaucratic discipline to this program. The first budget for this office, in 1989, was $440 million; it rose to $880 million the following year; $1.3 billion in 1991; then $2.6 billion, and soon was over $6 billion a year. By the time I took this job in 1993, this program was in real need of financial restraint. My predecessor, Leo Duffy, intuitively estimated in December 1992 that one out of three dollars was being wasted. Several months later, the results of a study we commissioned in early 1993 indicated that he was right. The data indicated that our project management costs were substantially higher than both comparable private sector projects and comparable Government projects. This situation was unacceptable. Beginning in 1993, we made cost reduction one of the highest priorities.

First, the administration imposed an overall cap on the growth in the budget for this program. Then we reduced the budget, in real terms. For example, last year's budget request was, in reality, a 4 percent reduction in budget when viewed against the added responsibilities of managing several of the largest and most complicated former defense nuclear sites. Responsibility for the Savannah River Site, the Mound facility, and the Pinellas Plant were all transferred to our program in 1995. This is a clear example that the program has committed to doing more with less.

Second, we have integrated information about risks to public health, worker safety, and the environment into the fiscal year 1998 budget formulation process. In doing so, we have made an effort to balance risk information with other factors that must be taken into account when setting priorities, making decisions, and allocating resources.

In 1993, Congress was concerned about how the Department was addressing its most pressing problems and establishing priorities among competing environmental management requirements and budgets, and required the Department of Energy to submit a risk report. The Department responded with the draft report, *Risks and the Risk Debate: Searching for Common Ground, The First Step,* which provides an analysis of the current and proposed risk management activities initiated to reduce risk and fulfill compliance requirements. The report evaluated risks to the health and safety of individual members of the public intended to be addressed by cleanup activities required by compliance agreements; the health and safety effect of, and the cost associated with, implementing the requirements.

This report provided the first link between budget, compliance agreements and risk activities. Department of Energy field program managers with expertise about activities categorized the environmental management work. This allowed the Department to capture the spectrum of risks associated with environmental management activities and linked the risks in a qualitative fashion to compliance and budget. After submission of the report in June 1995, with the advice of our external Environmental Management Advisory Board, we began the process of integrating information about risks to public health, worker safety, and the environment into our budget formulation. This process is iterative, and will continue and improve each year as we more fully involve stakeholders and peer reviewers.

Third, we set an immediate goal of a 20 percent increase in measurable productivity; a goal that most Fortune 500 companies would find ambitious. This initial productivity challenge was across-the-board in fiscal year 1994. We then set additional productivity goals for individual sites based on their effective use of additional project managers and cost-analysis personnel. We believe we have eliminated most of the "fat" from the program we inherited in 1993.

Fourth, to ensure long-term and systematic improvement in productivity, we began a contract reform initiative to provide incentives appropriate for the new mission. Much of problem, we have learned, was that the workforce and contracting methods used in the past were simply inappropriate for the new mission of Environmental Management. We also recognized that the skill mix of the workforce for the new mission at many sites was out of balance, and we undertook a significant reduction in unneeded contractor workforces. As this Subcommittee understands, contract employees comprise most of the personnel at our sites. We have had to cut contractor workforces from a level of approximately 50,000 in 1993 to around 30,000 today. We know that this downsizing has been painful for individuals, families and local economies. We have complied with the letter and the spirit of the requirements of section 3161 of the 1993 Defense Authorization Act, to ensure that the contributions of these "veterans of the Cold War" are not forgotten. But times have changed dramatically, and the current and future missions of the Department demand a contractor workforce with the appropriate skills and of the right size. But we also recognize that we must bring stability to our sites that range from South Carolina to Idaho to Washington. I want to emphasize again that it is critical that Congress appropriate all of the President's budget.

The contract reform initiative has also been vital to making the transition from a Cold War system to the new missions at many of these sites. Through this initiative, we have fundamentally changed the way contracts are written and awarded for our sites. The tradition of a single prime Management and Operating contractor working at a site for decades, on a cost-plus award fee basis, was dictated by Cold War production imperatives. Today's imperatives are efficiency, progress, and accountability. Our new contracts reward contractor performance. Performance is measured through cost control, safety and real on-the-ground results.

For example, the recently awarded Rocky Flats contract establishes specific results and goals for the contractor, and the contractor will be paid based on the achievement of these results. Fully 85 percent of the contractor's fees will be based on performance, while only 15 percent is base fee. The Rocky Flats contract also provides substantial incentives for cost savings by the contractor. Upon validation by the Department of these cost savings, the contractor will receive 35 percent of the cost savings, with half of those savings going directly to employees. The new contractor, Kaiser-Hill, has responded with excellent productivity within the first year of the contract. For example, when a couple of long-abandoned guard shacks had to be demolished, Kaiser-Hill side-stepped the traditional approach of doing unnecessary studies and filling out forms, and simply knocked them down during a weekend to avoid safety hazards for the regular workforce. We need more "just-do-it" attitude like this, and new contracting methods will encourage it.

These new types of contracts will also save money because they are awarded competitively. Within the past 2 years, the Department has initiated competitions with respect to its for-profit contracts at five of its major sites—Idaho National Engineering Laboratory, Rocky Flats, the Nevada Test Site, the Savannah River Site, and Hanford. Contractors have pledged savings of approximately two billion dollars in the first two competitively awarded procurements alone—the Idaho National Engineering Laboratory and the Rocky Flats Environmental Technology Site. In addition, we have changed the way characterization studies and site assessments are handled in the contracts, so that emphasis is placed on doing the actual work, not simply studying the problem. New streamlined study procedures will ensure that the problems are properly assessed, avoiding getting mired in drawn out research that takes time and costs money.

Much of the recent work we have done to reform contracts and improve efficiency is still in the "predicted" or "expected" stage. However, we already have indications that these changes are working. For example, by privatizing the sanitary waste disposal activities at our Savannah River Site, we saved $34 million by eliminating the need to construct a new facility. At our Hanford site, we reduced financial, administrative, and information management functions which allowed a savings of approximately $60 million. These are real and significant savings, and are indicative of the expectations we have for the future, and demonstrate the real need we have for change.

In addition to these new site management contracts, we have also made good on our commitment to privatization where it makes financial and programmatic sense.

In the past 2 months, we have released Requests for Proposal for waste treatment facilities at the Hanford and Idaho sites. In both of these efforts, the contractor will not be paid until the treated waste is actually delivered from a predetermined mixture of raw waste feed.

We are also, partly at the insistence of Congress, capitalizing on opportunities to change the way we carry out administrative programs. We have reduced our headquarters expenditures by over 36 percent, or $140 million, in the last year. One example is the major reductions we have instituted in headquarters support services contracting. Another example is defining a streamlined Environmental Impact Statement process with a goal of reducing process time from 33 months to 15 months, saving an estimated $26 million over 5 years. The Department received the 1995 Federal Environmental Quality Award for this effort.

We are also making progress on reducing our uncosted balances. Uncosted balances have been an issue of concern to Congress. It must be understood, however, that substantial cuts cannot be taken painlessly by reducing uncosted balances. Uncosted obligations are not "free money" as some believe. These funds are fully committed to ongoing or planned cleanup activity. We are continuing to reduce our uncosted obligations and our current balances are less than previous years. All of these funds have been "obligated" for specific projects, but they will only be "costed" when the project is complete and the bill is submitted by the contractor. When our bills come due, we have to pay them.

Recently, the Office of Environmental Management defended its uncosted balances to staffs of several Congressional Committees and the General Accounting Office. We believe that our methodology was accepted and understood by the Congressional staffs. They applauded the progress that Environmental Management has made in reducing its uncosted balances by over 25 percent over the last 2 fiscal years.

Finally, we have undertaken intensive efforts to wring out as much savings as possible at each major site through the use of a management technique known as "work-outs". These involve assembling all of the necessary information and analysis, with the principal decision-makers related to a site, and addressing each of the perceived stumbling blocks to progress, one at a time. The first of the these work-outs focused on the Hanford site, and was heralded by all sides—the State of Washington, the United States Environmental Protection Agency, contractors, site management and Headquarters DOE management—as the breakthrough "St. Louis Blueprint for Action" after the city where it was held. One product from the session was the establishment of a tentative agreement to amend the Hanford Tri-Party Agreement to provide for a single regulator concept. The idea was that only one regulatory agency will be involved in the day-to-day oversight and decision making on specific environmental management decisions.

We have also held work-out sessions for the Savannah River Site, which was held in Rock Hill, South Carolina. In these sessions, the parties agreed to define and implement strategies and tactics to streamline, simplify and improve the effectiveness of the Site's interaction with its regulators. For example, the parties agreed in principle to: a more collaborative approach to establishing and meeting cleanup objectives; adoption of the lead regulator concept for RCRA permitted cleanup; and minimizing duplication between RCRA and CERCLA requirements. Agreement was reached on specific productivity enhancement proposals with savings that could be applied to other site functions. Related cost savings could range from $65 million to $130 million. It is expected that these savings, in part or in whole, would carry over into the out years and depending on the pace of implementation, should yield some savings in Fiscal Year 1996. I am pleased to report that all sides are living up to their commitments in the Rock Hill agreement, resulting in substantial improvements in the operation of the Savannah River Site.

GOAL 4: Demonstrate Results

The Environmental Management program has also proven that it can establish priorities based on risk and get tangible cleanup results for the taxpayers' dollars. We have formally integrated risk-based approaches into our work by mandating that risk prioritization be conducted as part of our site budget guidance. Site managers must now assess the risks at their sites, and develop their budgets accordingly. I would like to call to your attention some of our accomplishments in the last year, both nationally and at specific sites.

Nationally we have:

- Completed 2,538 release sites, nearly 30 percent of the estimated total number of 8,854 to be remediated. Moreover, 20 percent, or 182 of the 978 facilities to be cleaned up, have been completed.

- Entered into 29 Orders under the Federal Facility Compliance Act with authorized regulatory agencies for 32 of the 35 sites for which DOE submitted Site Treatment Plans.
- Completed 119 interim actions, 75 larger-scale cleanups and 17 decommissioning actions, resulting in 5 million cubic yards of mill tailings, soil, and rubble stabilized, contained, or otherwise addressed. To put this in perspective, this amount is enough to cover a hole the size of a football field half a mile deep. The Department also completed action on 1,225 individual release sites and 25 facilities in fiscal year 1995, and will have completed an additional 892 interim and remedial actions by the end of fiscal year 1997.
- Completed remediation of six former industrial processing sites under the Formerly Utilized Sites Remedial Action Program (FUSRAP) (with 21 out of 46 in the program now complete), and two sites where uranium mining and milling once occurred. Fifteen out of 24 Uranium Mill Tailings Remedial Action Project (UMTRA) are now complete. Remediation was also completed at 57 public and private properties contaminated with uranium tailings from these former processing sites.
- Made road-ready for disposal 270 cubic meters of transuranic waste. Treated 3500 cubic meters of low-level waste mixed waste and disposed of 46,000 cubic meters of low-level waste.
- Over the past 2 years, made available for transfer for implementation 48 new or improved technologies. A comprehensive review of 15 of these new technologies revealed that, depending upon the degree of cleanup, at least $9 billion and as much as $80 billion can be saved through the use of just these 15 processes.
- Issued *Principles for Using Risk Analysis,* a first cut at defining risk analysis, its purposes, and the principles to be followed if it is to be done well and credibly.
- Issued the *Draft Risk Report* to Congress, a first step toward developing a consistent approach to evaluating the risks to the public, workers, and the environment posed by conditions at DOE's sites and facilities.

At the Idaho National Engineering Laboratory, we:

- Deactivated two key buildings at the Idaho Chemical Processing Plant (ICPP), saving out-year cost of $24.5 million.
- Demonstrated at full scale the Dig Face Characterization system, an innovative new technology that provides quick, non-intrusive characterization of buried waste in support of retrieval operations. This technology allows "on-the-spot" characterization of soil and waste samples since it performs the analysis as it collects it. This system also reduces risks to workers since characterization can be performed remotely and rapidly to identify any potential hazards.
- Began incineration of low-level mixed waste 1 month ahead of schedule at the Waste Experimental Reduction Facility.

At the Savannah River Site in South Carolina, we:

- Reduced radioactive and hazardous waste generation for a savings of $4.6 million in disposal costs.
- Approved and started radioactive operations at the In-Tank Precipitation Facility. This system is an essential part of treating the 34 million gallons of liquid high-level radioactive waste at the site. It separates the highly radioactive portions of the waste from the low level portions. The low level portion, which constitutes about 90 percent of the volume, is then transferred to the saltstone facility for treatment. The high level portion will be vitrified.
- Transferred 24,000 gallons of high level waste on February 29, 1995 from the In-Tank Precipitation Facility to the Saltstone Facility.

At the Oak Ridge Site in Tennessee, we:

- Eliminated 90 percent of the low-level radioactive waste generated per year from the Radioactive Material Management Area. Shrinking the radioactive work area resulted in less contaminated protective clothing and saves over $1 million per year in waste disposal and operations costs. The project cost $300,000 and took 5 months to implement.
- Treated and discharged 100 million gallons of contaminated water.
- Treated 3.1 million pounds of mixed waste at the Toxic Substances Control Act (TSCA) incinerator at Oak Ridge. Cumulatively, we have treated almost 15 million pounds of waste at the TSCA incinerator.

At the Hanford Site in Washington, we:

- Consolidated special nuclear material for storage and surveillance, providing cost savings of $2.5 million.
- Removed over 56,000 pounds of carbon tetrachloride from the soil above the ground water and treated 1.7 billion gallons of groundwater.
- Completed removal of 183,000 gallons of radioactively contaminated nitric acid from the PUREX facility saving $70 million to the total project cost.
- Modified the recycle condensate water in the evaporator system at Hanford and reduced liquid mixed radioactive waste generation by almost 200,000 gallons each year resulting in an annual savings of $3.6 million. The evaporator is expected to continue in operation for the next 10 years.
- Saved $37 million in waste treatment and facility maintenance costs by shipping 186,987 gallons of uranium-contaminated nitric acid from Hanford for reuse in Sellafield, England.
- Completed defueling of the Fast Flux Test Facility at Hanford 4 months ahead of the deactivation schedule.

At the West Valley Demonstration Plant in New York, we:

- Completed construction of the Vitrification Facility, the support NOX Facility, and the Load-In Facility. Preparations for radioactive operations are underway, and the first radioactive canister is scheduled to be processed in June of 1996.

At the Rocky Flats Environmental Technology Site in Colorado, we:

- Emptied the last of five contaminated solar ponds in January, which were filled with low-level radioactive process water.
- Completed construction of a new Centralized Waste Storage Facility 5 months ahead of schedule and $500,000 under budget.
- Completed venting and aspiration of 518 drums of transuranic and mixed transuranic wastes, leaving 700 to be vented.

At the Mound Plant in Ohio, we:

- Decontaminated, decommissioned and completely removed the 18,000 square foot Special Metallurgical Building previously used as a radio chemical laboratory primarily processing plutonium-238.
- Made available approximately 10 percent of the Mound plant land area (29 acres)for sale or title transfer by acquiring U.S. Environmental Protection Agency and Ohio Environmental Protection Agency concurrence that the land met an industrial risk scenario protective of human health and the environment.

At the Fernald Site in Ohio, we:

- Completed all Environmental Restoration milestones on or ahead of schedule, including several major removal actions (Plant 1 Ore Silos, Fire Training Facility, Plant 7).
- Determined through successful public involvement site future land use, site cleanup levels, waste disposal locations, and cleanup priorities.

GOAL 5: Focus Technology Development

We have focused technology development on five major areas: Mixed Waste Characterization and Treatment; Radioactive Tank Waste Remediation; Contaminant Plume Containment and Remediation; Landfill Stabilization; and Decontamination and Decommissioning. Crosscutting activities that apply to all or some of the focus areas are also conducted: Characterization, Monitoring and Sensors; Efficient Separations and Processing; Robotics; and Technology Integration efforts to enhance the focus areas' ability to achieve accepted, commercially available products. In fiscal year 1996, a science program was initiated and added to this program to bridge fundamental and applied technology development research. The Environmental Management's risk management activities are also conducted from the Office of Science and Technology.

Work does not end with developing the technologies. Regulatory and stakeholder acceptance of these technologies is paramount to implementation. Also, States each require rigorous validation processes. Through the Western Governors' Association DOIT (Develop On-site Innovative Technologies) committee, an 18-state Interstate Technology and Regulatory Committee was established with the aim of expediting this process. A major accomplishment was achieved in April 1995 when four States (California, New Jersey, Illinois, and Massachusetts) signed a Memorandum of Understanding through which these States agree to share information on technologies and to accept participating States' validation work. This saves time and eliminates duplicative work.

During fiscal year 1995, 13 new technologies were implemented at waste cleanup sites. For instance, ResonantSonic Drilling, an innovative drilling technology that increases drill penetration in difficult geologic media and reduces drilling wastes, was used in Hanford, where it achieved greater than 25 percent cost savings over baseline methods. Also, the Rapid Transuranic Monitoring Laboratory, which provides on-site monitoring of contaminated air and soil, was selected for implementation at the Savannah River Site. This system is capable of processing samples in less than 1 hour at a cost of approximately $30 per sample compared to $200 to $300 per sample using traditional methods.

GOAL 6: Strengthen Stakeholder Partnerships

Dealing openly and effectively with States, Tribes and the public is not only the right thing to do, it is a requirement of doing business successfully in modern America, and it can actually reduce cost and improve policy. Hence, we have made this a major element of our operations. Here are few examples of our successes in this area.

- We completed negotiations with the State of Idaho on the terms of a settlement agreement and court order covering the receipt, storage and eventual removal of spent nuclear fuel from the State of Idaho. The agreement and court order also covers the treatment of transuranic wastes and their eventual shipment to the Waste Isolation Pilot Plant (WIPP).
- We have established a total of 11 Site-Specific Advisory Boards (SSAB) Fernald, the Grand Junction Projects Office (Monticello, UT board), Idaho National Engineering Laboratory, Hanford, Los Alamos National Laboratory, Nevada Test Site, Oak Ridge, Pantex, Rocky Flats, Sandia National Laboratory, and Savannah River Site. Another SSAB is presently being formed at Paducah and should be in place in the near future.

Citizen participation is an essential part of our decision-making process. Besides enhancing credibility and accountability, it has proven to be economical and effective. For example, after the Fernald Citizens Task Force examined and analyzed conditions at the site—comparable in scale to Ford Motor Company's River Rouge plant—they concluded that different parts of the site would be suitable for different future uses. As a result of the collaborative process with the site contractor and the Department, recommendations were made which will save time in completing the cleanup and an estimated $1 billion in costs over the life of the project. It is a very "profitable" return on investment.

These are only some of the achievements we have realized over the past year. While we can look back at the improvements and solutions, moving forward on our long term goals is of the utmost importance. Accordingly, I will turn now to our plans for the future.

1997 COMMITMENTS FOR THE ENVIRONMENTAL MANAGEMENT PROGRAM

To carry out these diverse tasks and meet our goals, the Environmental Management program is organized into different program offices. Four primary programmatic entities—the Offices of Waste Management, Environmental Restoration, Nuclear Material and Facility Stabilization, and Science and Technology Development—carry out the core missions of the Environmental Management program, with assistance from other Departmental support offices. Our fiscal year 1997 program commitments, included as an appendix, demonstrate a consistent, clear approach to addressing the legacy of 50 years of nuclear weapons production.

Let me briefly describe each office and its commitments for fiscal year 1997.

WASTE MANAGEMENT

The Waste Management program manages the treatment, storage and disposal of wastes, and works to minimize the amount of new wastes generated. The Department is faced with a variety of wastes, including high-level radioactive waste (such as the waste found in the Hanford tanks), transuranic waste, low-level radioactive waste, hazardous waste, and mixed waste (waste that is both radioactive and hazardous).

In addition to maintaining safe storage, the Department continues to operate treatment and disposal facilities while developing badly needed additional treatment and disposal capabilities. Examples of these projects include the Tank Waste Remediation System at Hanford; the Defense Waste Processing Facility at the Savannah River Site; the West Valley Demonstration Project in New York; and the development of Site Treatment Plans with 20 States where the Department stores or generates mixed waste.

ENVIRONMENTAL RESTORATION

The Office of Environmental Restoration is responsible for the assessment and remediation of facilities and land no longer used for nuclear weapons production, as well as other inactive sites. These sites range from contaminated buildings to abandoned or inactive waste disposal sites. It is this portion of the overall Environmental Management program that is often described as the "cleanup" program.

We are continuing to move away from doing studies to engaging in actual cleanup. The environmental restoration work passed a significant milestone in 1995—the funding for on-the-ground cleanup work exceeded the amount spent on paper studies and assessment for the first time. Certainly, some investments in studies are necessary to ensure that cleanup funds are spent effectively. However, it was clear in 1993, that the time to "move dirt" and not produce paper had come. Since then, the funding shift has been dramatic. In Idaho, we spent roughly equal amounts ($40 million) in fiscal year 1994 on cleanup and assessments. In fiscal year 1995, the funding for assessment dropped to $25 million, while the amount spent on cleanup skyrocketed to $75 million. In fiscal year 1996, the funding in Idaho for assessments further decreased to less than $20 million, while the amount spent on cleanup remained at approximately $75 million. Now, for fiscal year 1997 we are proposing to spend even more on cleanup (nearly $85 million), while our funding for studies remains less than $20 million.

The same success story can be told for the Savannah River Site. In fiscal year 1995, we spent more on studies than on cleanup ($35 million versus $22 million). In fiscal year 1996, however, we reversed this pattern and spent nearly $70 million on cleanup and less than $50 million on assessments. In fiscal year 1997, we plan to spend less than $30 million on studies and more than $80 million on cleanup.

For the long term, we must fundamentally rethink the wisdom of attempting to remove all contaminated soil. Certainly, we must remove contamination where it is necessary to protect public health and the environment. Depending on what strategy is chosen, widely varying amounts of contaminated material could require exhumation and redisposal. If only a minimum of soil and contaminated is removed, we could still generate more than a million cubic meters of material in the next several decades. If we go to the other extreme, and remove virtually all contaminated soil and material for redisposal, as much as 100 million cubic meters of materials could require redisposal. Removing this amount of contaminated material could entail some risks to the workers and to those who would be exposed along any transportation corridors. We should think very carefully before we embark on any strategy without thinking through its potential consequences for risks as well as costs.

NUCLEAR MATERIAL AND FACILITY STABILIZATION

The mission of the Office of Nuclear Material and Facility Stabilization is to reduce the high-risk conditions associated with unstable excess nuclear and chemical materials left at former nuclear weapons production facilities and reduce the maintenance costs associated with stabilizing buildings awaiting decontamination or final disposition. This involves the protection of workers and the environment from exposure and contamination, the stabilization of hazardous nuclear and chemical materials, deactivation of facilities to attain the lowest surveillance and maintenance costs, and transfer of facilities to the Office of Environmental Restoration for decontamination and decommissioning. This program area is responsible for some of the potentially most severe risks in the system: unstable plutonium and spent nuclear fuel.

Last year, the Environmental Management program's responsibilities in the Nuclear Material and Facility Stabilization program area essentially doubled as the result of transferring the responsibility for the Savannah River Site in South Carolina, the Mound Site in Ohio, and the Pinellas Plant in Florida from the Office of Defense Programs to the Environmental Management program, as well as approximately fifty high-risk facilities at other sites in several States. This is the fastest growing program within the Office of Environmental Management.

This year, the Department transferred responsibility for spent nuclear fuel management from the Office of Waste Management to the Office of Nuclear Material and Facility Stabilization. This transfer reflects the fact that much of the spent fuel will require some type of stabilization before final disposal. Spent nuclear fuel management is a critical component of the office's duties. There are approximately 2,700 metric tons of highly radioactive spent nuclear fuel currently in storage among the Department's sites. Much of this is in deteriorating condition since it has been in storage far longer than planned. In some cases, the risks to workers and potentially the public are urgent, since corroding fuel elements can release radioactivity into the storage pool water and possibly to the environment. The Office of Nuclear Material and Facility Stabilization now has the responsibility for safely managing the Department's spent nuclear fuel.

A vital role of this office is to maintain, and when appropriate utilize, the capability for reprocessing spent fuel. This technology was used to extract fissile material for defense purposes during the Cold War. This same technology is now being used to stabilize corroded spent fuel, producing a relatively stable form of plutonium or highly enriched uranium, and a variety of wastes, including high level liquids, which are intended to be vitrified in the Defense Waste Processing Facility; transuranic wastes, which are intended to be disposed of in WIPP; and low level waste, which will be disposed of on-site at the Savannah River Site. Although the volume of these wastes is much larger than the volume of the original spent fuel, each waste form can be stabilized with existing technology, and has an established "path forward" for addressing final disposition issues.

The Department is now examining the future role of the reprocessing canyons at the Savannah River Site, which are the last operating reprocessing facilities in the United States. A preliminary study on the utilization of these two canyon facilities indicates that all the necessary reprocessing operations could be conducted in the F-canyon, and that the nuclear material in the H-canyon that requires reprocessing could be transferred to the F-Canyon, resulting in a potential savings of approximately $200 million over the next several years. This consolidation could also allow the limited pool of experienced managers to be transferred to the F-canyon, resulting in more efficient operations. Of important note, however, the Defense Nuclear Facilities Safety Board and this Subcommittee have expressed concerns about the need for maintaining redundancy in the case of a catastrophic accident. The Department will continue to emphasize safety of operations and future mission as paramount issues in making this decision. In addition, we are making a substantial investment in developing new technologies to stabilize spent fuel and irradiated targets with less and lower cost than traditional reprocessing.

As of October 1, 1995, the Office of Nuclear Material and Facility Stabilization transferred the "landlord" responsibilities to a new office within the Environmental Management Program, the Office of Site Operations. The Office of Site Operations was specifically created to support the road maintenance, fire safety, security, utilities, and all the other essential but less prominent necessities of running our sites. The top priority associated with the Office of Site Operations is to maintain a safe, reliable, and cost-effective infrastructure and site services.

SCIENCE AND TECHNOLOGY DEVELOPMENT

Some of the environmental, health, and safety risks present at our sites simply do not have solutions with today's technology, or today's solutions would cost too much. By recognizing the potential for new technologies to provide better and cheaper solutions, we can identify projects that can be stabilized for the near-term, while we allow science and engineering research to find the better long-term answer. The Office of Science and Technology Development reflects our strategy of investing in technology development to develop long-term effective methods for addressing environmental challenges. The goals of our technology development program include reducing risks to people and the environment, reducing cleanup costs, and finding new technologies for environmental problems for which no solutions currently exist. The Office of Science and Technology Development program is an aggressive national program of basic and applied research, development, demonstration, testing, and evaluation for environmental cleanup, waste management, and related missions. Our strategy is to identify and develop technologies that can clean up the nuclear weapons complex, and manage the wastes more quickly, more safely and at a lower cost. In many cases, developing new technologies presents the best hope for ensuring a real reduction in risk to the environment and improved worker and public safety, especially given our national fiscal constraints.

Responding to a Congressional mandate from the fiscal year 1996 Energy and Water Appropriations Act, DOE has initiated a $50 million partnership between the Office of Science and Technology in the Environmental Management program and DOE's Office of Energy Research to advance the weapons cleanup program. The administration will propose an additional $40 million in the fiscal year 1997 budget to advance the effort. The new program will carry out a long-term research agenda focusing on the fundamental science needed to develop less costly, innovative cleanup methods and reduce risks to cleanup workers and communities near weapon cleanup sites.

In addition to the focus areas previously discussed, the Department is making a substantial investment in developing new technologies to stabilize spent fuel and irradiated targets. We expect to continue this investment for several years. We are making this a new focus area and expect to invest $20 million in fiscal year 1997 and expect to eventually spend nearly $100 million at the Savannah River Site and the Idaho National Engineering Laboratory for this purpose.

CONCLUSION

We are making real progress in the Environmental Management program in addressing some very real health and safety risks and in improving the way we do business. Nonetheless, given the long-term nature of the program, it is critical to have a vision for the future, beyond a 1- or 2-year budget cycle.

One of the basic problems with the Environmental Management program when it was created was that it was a stepchild of an organization that had very different priorities and missions. Today, the work of the Department with respect to nuclear weapons is much reduced and refocused. The Environmental Management program's mission has grown dramatically as we have learned the extent of the challenges we face, and as public awareness and concern about safety and health has heightened.

The environmental, safety and health problems in the nuclear weapons complex are often larger and typically more intractable than those of most conventional commercial cleanup programs. In many cases, no effective long-term technologies exist to clean up hazardous and nuclear waste sites. Even where technology exists, we often lack clear standards on "how clean is clean?" The fiscal reality is that there will be less money for activities we have performed in the past. It is critical to recognize that although we can economize and increase efficiency, there is a point beyond which further reductions in our budget mean less work, and increase the risks to public health, workers, and the environment.

Despite these challenges, we are moving forward. The program inherited business practices, managerial structures, and contractual systems not designed for effective completion of the type of work to be done. We have changed this and are creating a strategy to meet our goals. My vision for the program is one that will blend business practices that are proper for the type of work that we do with the accountability and responsibility that are required of us as public servants. Our long-term strategy involves focusing on stabilizing the problems at our sites using risk based priorities, while simultaneously making the necessary investments in developing new technologies to grapple with certain intractable problems in a more cost-effective manner. We have substantially increased our investment in science and technology with the new basic science initiative and the new spent fuel technology development program, which is centered at the Savannah River site and Idaho. Having made these investments, we are confident that the work we do in stabilizing the sites will buy us the time to implement these new more cost-effective remedial technologies in the future. I am confident that the same ingenuity that fought the Cold War will enable us to successfully seek solutions to the current challenges we face. I ask you for your full support for our budget request to continue our progress in this vital program.

APPENDIX—ENVIRONMENTAL MANAGEMENT COMMITMENTS FOR THE FUTURE

With new contracts, leaner site infrastructures and effective technologies in place, we are poised to make substantial progress in Fiscal Year 1997. We in the Environmental Management program are willing to be measured against our commitments across the country.

SOUTH CAROLINA (SAVANNAH RIVER SITE)

The Office of Waste Management will:

- Produce 150 canisters of high-level waste from Defense Waste Processing Facility (DWPF).
- Operate in-tank precipitation at full capacity, which results in an adequate feed of prepared pretreated waste for the DWPF.
- Retire four high-level waste tanks from service.

The Office of Environmental Restoration will:

- Install a final cap at the 20-acre low-level radioactive waste disposal facility to eliminate pollutant migration, and an interim cover over a 76-acre radioactive waste burial ground to significantly reduce contaminant mobility, at the Savannah River site in South Carolina.

- Complete construction, installation, and start-up of the F&H Canyon ground water remediation systems, which will remove hazardous contaminants and control tritium migration, and operate three air strippers and five soil vapor extraction units, which will remove 10,000 pounds of volatile organic compounds per month from soils and ground water, at the Savannah River site.
- Deploy advanced retrieval technologies, such as the use of water jets, for the removal of the saltcake portion of liquid high-level waste from Tank 41. New approaches and technologies for tank waste treatment will cut costs since the amount of support infrastructure and associated equipment is reduced. Currently, approximately $18 million is spent on the infrastructure equipment used for conventional tank waste preparation prior to transfer.
- Complete the optimization of magnetic separation technology (MAG*SEP) for treatment of waste waters from site cleanup at the Savannah River Site; develop new in situ applications for this technology.
- Develop electrochemical, crystallization, and salt splitting processes to reduce low level waste volume disposal.

The Office of Nuclear Material and Facility Stabilization will:

- Complete stabilization of 3,500 gallons of Plutonium-242 solution stored in H-Canyon. This material poses a risk to workers, and was identified as a high-priority by Defense Nuclear Facility Safety Board Recommendation 94–1.
- Begin stabilization of the Mark-16 and Mark-22 spent nuclear fuel, containing 7.3 metric tons of heavy metal.
- Complete stabilization (conversion to metal) of the Mark-31 Plutonium targets, containing 139 metric tons of heavy metal.

IDAHO (IDAHO NATIONAL ENGINEERING LABORATORY, ARGONNE NATIONAL LABORATORY—WEST)

The Office of Waste Management will:

- Operate the Sodium Processing Facility (SPF) to treat 70,000 gallons bulk sodium at Argonne National Laboratory-West.
- Restart the New Waste Calcining Facility, which uses thermal treatment to convert waste from liquid to a granular form, and process 140,000 gallons of liquid high-level waste into more stable form for safe storage.
- Continue incineration of low-level waste (LLW) and mixed LLW in the Waste Experimental Reduction Facility (WERF) to treat 6,500 cubic feet of inventory.
- Begin the private sector treatment of transuranic and mixed radioactive and hazardous chemical waste. The Request for Proposal has already been issued and waste treatment is expected to begin in June 1996.

The Office of Environmental Restoration will:

- Complete retrieval and treatment facilities construction and limited production test of operational systems, and initiate the retrieval and treatment of pit contents, at the Idaho National Engineering Laboratory (INEL), Pit 9.
- Install landfill caps at the Central Facilities Area burial grounds and the former SL–1 reactor/BORAX I reactor burial grounds, and complete the Decontamination and Decommissioning of the Advanced Reactor Area II, at INEL.

The Office of Nuclear Material and Facility Stabilization will:

- Complete deactivation of Advanced Reactor Measurement Facility, e.g., capping of floor lines, turning off utilities, etc.
- Complete transfer of all 627 spent nuclear fuel elements from the North and Middle Basins of CPP–603 to safer storage areas, and continue fuel repackaging and transfer from the South Basin of CPP–603.

The Office of Site Operations will:

- Complete the replacement of 49,000 square feet of roofing on 3 facilities.

The Office of Science and Technology will:

- Demonstrate the dismantlement of the CP–5 Reactor at Argonne National Laboratory—West using hardened robotic remote systems that withstand radioactive degradation. Using hardened remote systems protects workers, is more cost effective, and prolongs the life of the equipment since it is protected against the damaging effects of radiation and other environmental hazards.

- Complete a large-scale decontamination and dismantlement demonstration at the Chicago Pile-5 Test Reactor at Argonne-East.
- Develop processes to extract strontium, cesium, technetium, lanthanum and transuranics in a single process at Argonne National Laboratory.
- Deploy the Light Duty Utility Arm in Idaho liquid high level waste tanks to inspect tank surfaces and demonstrate its full-scale retrieval capability.
- Demonstrate a mobile van waste inspection systems that will perform nondestructive evaluation and assay (analysis) of containerized nuclear wastes at Idaho National Engineering Laboratory. (The combined nuclear techniques will assay wastes to meet performance requirements of the Waste Isolation Pilot Plant acceptance criteria.)
- Complete radioactive bench-scale testing of the Plasma Hearth System, and transfer the technology to mixed waste treatment privatization initiatives.
- Complete demonstration of viscous liquids containment and prepare performance standards based on the results. Test innovative verification and monitoring tools.
- Complete implementation of the Telerobotic Retrieval System at Pit 9.
- Complete in situ (in place) stabilization of buried waste using grouting techniques and prepare performance standards.

NEW MEXICO (SANDIA NATIONAL LABORATORY, LOS ALAMOS NATIONAL LABORATORY, WASTE ISOLATION PILOT PLANT)

The Office of Waste Management will:

- Develop and operate mobile treatment units to treat waste from our past operations as well newly generated mixed waste at Albuquerque and other DOE sites to comply with the Federal Facilities Compliance Act (FFCAct).
- Continue remediation of transuranic waste at Los Alamos National Laboratory while we work toward a new completion date for a renegotiated Consent Order with New Mexico. Remediation includes retrieving waste from earthen covered storage units that do not meet certain Resource Conservation and Recovery Act (RCRA) requirements and placing the repackaged waste on storage pads under metal framed domes that meet RCRA requirements.
- Submit to the Environmental Protection Agency (EPA) an application to certify the Waste Isolation Pilot Plants (WIPP) compliance with EPA's disposal regulations for transuranic waste.
- Obtain a final decision from the EPA on the DOE No-Migration petition for WIPP.

The Office of Environmental Restoration will:

- Complete ten expedited cleanups at Los Alamos National Laboratory in New Mexico.

The Office of Science and Technology will:

- Test innovative designs and alternative materials for barrier protection to determine cost and performance parameters and to verify integrity techniques.
- Test various ion exchange materials, at Sandia National Laboratory, on both simulated and actual radioactive material, to determine best method to remove cesium, strontium, and technicium from high level waste streams.

WASHINGTON (HANFORD SITE)

The Office of Waste Management will:

- Eliminate imminent safety risks and substantially reduce maintenance costs for a significant set of high level radioactive waste tanks. Routine mandatory requirements for protective clothing and equipment will not be required for entry. Key parameters like temperature and pressure will be monitored remotely.
- Resolve high heat safety issue after retrieval of waste from high level radioactive waste tank number C–106.
- Complete scientific investigation into the potentially serious problem of accumulations of gases resulting from the chemical reaction of ferrocyanide in the tanks, which has occurred in an uncontrolled manner after the addition of chemicals to the tanks, prior to the imposition of modern technical and safety controls.

- Start interim stabilization of seven flammable gas watch list tanks. This will remove the pumpable liquids from the organic watch list tanks to reduce leakage of high lead radioactive waste in case these tanks begin to leak.
- Complete construction of and begin operation of Project W–030, the Tank Farm Ventilation Upgrades. This project will ventilate tanks that have a higher potential for accumulation of flammable gases.
- Complete removal of floating organic layer in Tank C–103. This project will remove the flammability potential and the potential for noxious vapors from the organic layer.
- Complete construction of "cross-site" transfer line. This will allow transfers of waste between high level waste storage areas and allow for the removal of waste from tanks that are found to be leaking or have other safety problems in the single shelled tanks, to the safer and much newer double shelled tanks.
- Startup of the Waste Receiving and Packaging Facility (WRAP–1) which will package low level waste for ultimate disposal.
- Complete construction of the Phase V portion of the Central Waste Complex which will be a 168,000 square foot storage facility for transuranic waste and mixed low level waste.

The Office of Environmental Restoration will:

- Excavate and remove over 100,000 loose cubic yards of contaminated soil at the 100–BC and 100–HR reactor areas at Hanford, Washington.
- Complete deactivation of the final 14 N Reactor facilities, including spent fuel basin cleanup, for eventual decommissioning and decontamination of the reactor at Hanford, Washington.

The Office of Nuclear Materials and Facility Stabilization will:

- Complete all of the deactivation activities at PUREX.
- Continue stabilization of Plutonium Finishing Plant materials according to the Defense Nuclear Safety Board (DNFSB) Recommendation 94–1 implementation plan. Initiate stabilization of Plutonium solutions using the vertical calciner, a thermal destruction process. Continue stabilization of reactive solids using muffle furnaces.

The Office of Site Operations will:

- Replace 71,000 square feet of unsafe roofing on 15 buildings at our Hanford site.

The Office of Science and Technology will:

- Complete a large-scale demonstration for safe storage or "cocooning" of the Hanford C-production reactor.
- Deploy an in situ (in place) organic contaminant detection sensor and moisture content sensor on the tip of the Cone Penetrometer, which will be pushed into Hanford tank wastes.
- Use of a subsurface imaging system (Electrical Resistance Tomography) to detect leakage from tank wastes.

COLORADO (ROCKY FLATS)

The Office of Nuclear Material and Facility Stabilization will:

- Complete stabilization of 18,000 liters of Plutonium solution in Buildings 371 and 771 and off-site conversion of highly enriched Uranium solutions to a solid form for storage.
- Repackage an additional 100 of the 700 (for a total of 205) inorganic drums to be repackaged by 2002. Close out remaining 11 of 21 mixed residue closure units.
- Complete design review and construction for pyrochemical salt stabilization project to begin the processing of approximately 16,000 kilograms of Plutonium-bearing salt resides for completion in December 1997. Complete design review and construction for the ash stabilization project to begin the stabilization of approximately 4,000 kilograms of sand, slags and crucible (SS&C).

TENNESSEE (OAK RIDGE RESERVATION)

The Office of Waste Management will:

- Continue safe operation and maintenance of treatment, storage, and disposal facilities for sanitary, hazardous, radioactive, and mixed waste.

- Treat 1.6 million pounds of liquid waste at a minimum, and 500,000 pounds of solid waste at the Toxic Substances Control Act (TSCA) incinerator.

The Office of Environmental Restoration will:

- Prepare the final ROD for Clinch River and complete an interim action to reduce strontium and cesium contamination of the White Oak Creek and the Clinch River at the Oak Ridge Tennessee reservation.
- Complete the decommissioning of six cooling towers at the K–25 site in Tennessee, thereby removing uranium contaminated sediments and eliminating fire and industrial hazards associated with the facilities.
- Treat ground water plumes in order to mitigate off-site ground water contamination and reduce the infiltration of oil into the ground water at the Portsmouth, Ohio facility.
- Initiate an interim action to cap a uranium burial ground to mitigate the leaching of uranium into ground water, and complete construction of a treatment facility to support an interim action for containing radioactively contaminated groundwater that is migrating off-site at the Paducah, Kentucky site.

The Office of Nuclear Material and Facility Stabilization will:

- Remove the spent nuclear fuel currently stored in the Bulk Shielding and Tower Shielding Reactors at Oak Ridge to the Savannah River Site.

OHIO (FERNALD, MOUND, PORTSMOUTH)

The Office of Environmental Restoration will:

- Complete the essential design activities and D&D of two highly-contaminated buildings, thereby maintaining the accelerated cleanup schedule while reducing risks to workers at the Fernald site in Ohio.
- Complete the construction and start up of a waste water treatment plant and the construction of the on-site disposal facility at Fernald to reduce further long-term risks to human health and the environment.
- Complete disposition of approximately 32,400 cubic feet of low-level waste and the remaining nuclear materials waste inventory, significantly reducing landlord costs and enabling building demolition to proceed on schedule, at the Fernald site.

The Office of Science and Technology will:

- Use innovative technologies and new processes that maximize efficiency and recycle potential, we will complete a large-scale decontamination demonstration at the Fernald Plant 1 uranium processing facility.
- Fully field test technologies at the Portsmouth Gaseous Diffusion Plant for in situ (in place) remediation of groundwater contaminated with radionuclides and organic compounds and with dense non-aqueous phase liquids (DNAPLs) in clay-like, low permeability material.

MISSOURI (KANSAS CITY PLANT)

The Office of Waste Management will:

- Replace faulty, leaking overhead industrial waste piping system in the Industrial Wastewater pre-treatment plant at the Kansas City Plant.

NEVADA (NEVADA TEST SITE)

The Office of Waste Management will:

- Continue disposal operations for packaged low-level wastes from other DOE sites.

CALIFORNIA (LAWRENCE LIVERMORE NATIONAL LABORATORY)

The Office of Waste Management will:

- Continue construction of consolidated waste treatment and storage facility at Lawrence Livermore National Laboratory.

FLORIDA (PINELLAS PLANT)

The Office of Site Operations will:

- Close and complete the transfer of the Pinellas Plant to the Pinellas County Industrial Council. Continue residual pump and treat, and administrative requirements.

Senator KEMPTHORNE. Mr. Secretary, thank you, and may I just state, as we all know from our actions last year, as is so often the case with the Armed Services Committee, it is very much a bipartisan effort. Speaking as a Republican for a moment, I was certainly one of many of the Republicans that supported the President's request for your budget, and intend to do so again, and again, this is often a committee that deals strongly in a bipartisan approach, plus the numbers are absolutely necessary.

With that, let me call on Mr. John Conway, who is the Chairman of the Defense Nuclear Facilities Safety Board, and may I say, Mr. Conway, both you and your board have a tremendous positive reputation, so we look forward to your comments.

STATEMENT OF JOHN T. CONWAY, CHAIRMAN, DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Mr. CONWAY. Thank you. I was going to begin by saying that I appreciate very much the compliments received this morning from the members of the committee, and I take it not for myself personally but for all my associates as well, because we work as a Board, a collegial body. The other four members of the Board are here with me, because the testimony I am going to give today is not my personal testimony. The testimony represents the Board's thoughts and positions.

Senator KEMPTHORNE. Mr. Conway, would you like to just introduce them, ask them to stand?

Mr. CONWAY. Right behind me, and from your left as we proceed, is Dr. A.J. Eggenberger, Dr. Herbert Kouts, Mr. Joseph J. DiNunno, and Captain John Jack Crawford, and I must say I have been very, very fortunate to have a group of technically competent individuals that have been associated with me. It is through their efforts any success we have to date has been achieved.

Senator KEMPTHORNE. Thank you very much. We welcome all you gentlemen, and we thank you for your service as well.

Mr. CONWAY. With your permission, I would like to submit to you the Board's statement, and if you would accept it as if read, I will pick up on a few points I would like to make, and particularly those points that you asked that I stress.

Senator KEMPTHORNE. Without objection, it will be made part of the record.

Mr. CONWAY. The February 23 letter from Senators Lott and Exon inviting the Board to testify today advised "the subject of the hearing will be the major recommendations of the Defense Nuclear Facilities Safety Board over the past several years and whether they have been effective in promoting the safe accomplishment of the nuclear weapons and environmental missions of the U.S. Department of Energy.

"In particular, you should be prepared to comment on the Ahearne Report's recommendations on external regulation of DOE nuclear activities and on the efficacy of all legislative DNFSB functions, including Recommendation 94–1."

So with that, I would like to pay attention to those matters that you were particularly calling for us to testify on. I would ask you to turn to page 6 of the prepared statement. There, I discuss the Ahearne Report. The Ahearne Report is a report of the Advisory

Committee on External Regulation of Department of Energy Nuclear Safety, generally referred to as the Ahearne Committee after one of the cochairmen.

The title of the report is "Improving the Regulation of Safety at DOE Nuclear Facilities." As the title implies, the Department of Energy already is regulated in most all of its activities by State and Federal Environmental Protection Agencies and by the Department of Transportation. By law, it must comply with OSHA requirements and the nuclear safety of its weapon mission activities are under the external oversight and action-forcing powers of the Defense Nuclear Facilities Safety Board.

What advantages will accrue from adding another level of regulatory authority over DOE's activities, and this is a recommendation from the Ahearne Committee that additional regulatory authority be put upon DOE, and they recommend it either be the Safety Board or the Nuclear Regulatory Commission.

Now, I ask again, what advantages will accrue from adding another level of regulatory authority over DOE's activities?

Justification for additional regulation is based on two suppositions, both of which we believe to be wrong. Number 1, that it will enhance DOE credibility with the public, and number 2, that it will improve safety.

We, as a Board, suggest that the public's trust in DOE will not increase by setting up another Federal Government agency here in Washington, D.C. to regulate its activities, whether the agency be the Defense Nuclear Facilities Safety Board, or the U.S. Nuclear Regulatory Commission, or some combination of the two operating in a formal regulatory manner.

Rather than by having more external regulation imposed upon it, DOE's credibility will improve by performing its responsibilities in an efficient and credible manner. We believe DOE has made notable progress as regards cooperation and openness, particularly in the formation and utilization of local citizen advisory boards.

Tom Grumbly made reference to some of that this morning, and we have seen evidence of that out in the field when we meet with the local population.

Trust and credibility are developed at the local levels, not by layering Government agencies.

Will more regulation improve safety? If so, at what additional cost? The Ahearne Report acknowledges that regulation would require additional startup costs, but asserts that savings will result from having fewer DOE employees assigned to environmental safety and health issues.

The NRC has advised that, if it is to assume regulatory responsibility for DOE, the Commission would need an additional 1,100 to 1,600 full-time employees and an increase of $150 million to $200 million per year in its budget. How much of that addition in personnel and dollar costs would DOE save?

We know of no organization in Government or in private industry that reduces personnel or response costs when additional regulatory authorities are imposed upon it. The opposite occurs.

The Ahearne Report does not set forth how savings will accrue from its recommendation, nor does it specify what safety improvements will occur and how they will occur.

The Ahearne Report, in the interests of improving safety, would have OSHA formally regulate DOE, requiring many more full-time inspectors to cover thousands of DOE facilities.

OSHA complains that it does not have sufficient inspectors to adequately meet its current responsibilities. In DOE nuclear defense activities, the actual work is done by employees of commercial organizations such as Westinghouse, Kaiser, Bechtel, Lockheed-Martin, and others. The managements of those companies are fully knowledgeable of OSHA requirements through their commercial activities.

DOE owns the facilities, and its line management should be alert in their obligations and make certain that contractors meet their obligations. In some cases, such as Rocky Flats, DOE does not directly manage the working contractors but uses another commercial contractor to manage or to integrate those contractors who do the actual work.

Thus, to implement the Ahearne recommendation, the Federal Government could end up with an OSHA Government agency worker enforcing safety rules at a Federally owned work place through a DOE employee who then, in turn, turns to the integrator contractor company to force the contractor doing the actual work to correct safety deficiencies or violations.

Now, the practical solution to the problem is to have DOE site personnel trained in OSHA safety regulations and then enforce those safety requirements on their contractors, who are required to comply with those requirements in their normal commercial work. We do not need another layer out there telling the DOE and deciding who is responsible for violations.

The Ahearne Report makes a very important observation when it notes that—and I quote now from the report—"no outside authority or authorities could or should be considered a substitute for an effective internal safety management structure and program," and that is a good statement and an accurate statement. Regulation by itself cannot assure safety is a maxim long known by those experienced in hazardous occupations.

A number of individual recommendations in the Ahearne report in our opinion are directed toward the ability of intervenors to delay the construction or operation of needed facilities and other activities through use of the courts of law and extended appellate reviews and, if implemented, would increase this ability.

The Ahearne Report recommended legislative changes to the Atomic Energy Act that would provide greater intervention rights than those which exist in the civilian nuclear field to those opposed to DOE's production and use of special nuclear materials for defense purposes. What it would do, it would give a greater opportunity for individual lawsuits in a defense activity than currently exists in the civilian area against the NRC.

Another recommendation of the report is to grant authority to the States to set more stringent facility safety standards, providing those standards "do not unduly hinder DOE in performance of its missions." Now, who is to determine what is unduly? We were talking about lawyers earlier in the day. Lawyers will have a field day with that one in the courts, up to and including the Supreme

Court, before a resolution is ever reached. That is to make work for the lawyers.

The report barely acknowledges the existence of the national security elements of the Atomic Energy Act, and it does not explain how national security will be impacted by the actions of an independent regulatory agency.

When Secretary O'Leary in January of 1995 created the Advisory Committee on External Regulation of the Department of Energy Nuclear Safety, and appointed Dr. Ahearne to be a cochairman, she requested the Defense Nuclear Facilities Safety Board to participate in the work of the committee. Mr. Joseph DiNunno, a member of our Board and a recognized nuclear safety expert, knowledgeable in environmental regulatory matters, volunteered. Throughout the past year, Mr. DiNunno devoted a great deal of time and effort to the undertaking.

Mr. DiNunno and a number of others who participated in the study did not concur in many of the recommendations set forth in the report. Attached to our prepared statement is a copy of Mr. DiNunno's separate views. It is Attachment 3.

Also, in view of his special insight as to the workings of the committee under the chairmanship of Dr. Ahearne, we have attached a copy of a presentation Mr. DiNunno recently made to the local section of the American Nuclear Society which we believe you will find to be both thoughtful and informative.

Mr. DiNunno's basic conclusion, after 1 year of intense involvement, and after careful consideration of the issues examined by the Committee, is, "Taken as a whole, the recommendations represent a regulatory model that will exacerbate DOE's problems, not help solve them."

Now, with regard to Board Recommendation 94–1, another area that you wished us to comment specifically on, I have attached also the full recommendation as made to DOE. The basis for Recommendation 94–1 was developed over a period of 3 years. As we visited various defense sites we observed the deterioration of fuel elements and other safety problems that, if they were not immediately attended to, or attended to in a relatively short period of time, could become an imminent hazard.

We found that when the DOE defense work was stopped, many facilities were left in the state in which they had been operating, and materials were not put in a stable form. We found they were continuing to get worse, and we found that they were in many cases being wrapped in material that over a period of time would cause further dangers to the workers.

So it was on the basis of these findings, and our discussions with experts in the handling of plutonium, that encouraged us to make Recommendation 94–1, and the basis of that is to go out to these areas and stabilize the material that exists today in these various facilities.

We think DOE has been responsive, and has been following this recommendation at the facilities we believe to be most hazardous, and Mr. Grumbly I believe said they appreciate the recommendations that have been made and will work to move forward.

With regard to Senator Kempthorne's question indicating he wanted to know if there was any area of deficiencies that we think are important, I would say one that we brought attention to each year in our annual report, is the need to improve the technical competence of the personnel in DOE. It is very, very important that the technical capability of DOE employees, particularly those in line management, be improved both by training and by bringing in new people.

This Committee was instrumental in obtaining a change in the law that authorizes the DOE to get beyond the Civil Service restrictions to be able to hire under excepted service, which permits them to move ahead, as the Board has been able to do in its employment of technically qualified people, to bring in technically qualified people without having to go through the restrictions of the old Civil Service laws. It is important that DOE continues to do that, and I would say that is one area of deficiencies that we are going to continue to push on which we think needs attention.

What additional means might the Board have, and I take it to mean additional authority, there is one area that we are currently working closely with DOE, and that is, as they revise their safety orders and standards we have agreed—the law first off requires this Board to review and evaluate the safety orders, requirements, and standards under which the DOE operates.

As they have been revising these orders—we could have sat back and waited until the revisions were completed. We have offered to work in parallel with DOE. As of now, six of the new orders we think are good. At least six additional new orders we take exception to, and we are trying to work with DOE to get that corrected.

Some of these orders that we do not believe are proper have been sent out in the field. We are trying to work with DOE to make sure that they get corrected. We do have a good working relationship, and we will continue to work with DOE in that regard.

With that, I will stop at this point and be available for any questions you may wish to ask.

[The statement of Mr. Conway follows:]

PREPARED STATEMENT BY JOHN T. CONWAY

Mr. Chairman and members of the subcommittee: We appreciate the opportunity to appear before you to discuss the Board's role in ensuring that the health and safety of the public and the workers are adequately protected throughout the Department of Energy's (DOE) defense nuclear complex. The February 23, 1996, letter from Senators Lott and Exon inviting us to testify today advised that:

> "The subject of the hearing will be the major recommendations of the Defense Nuclear Facilities Safety Board (DNFSB) over the past several years and whether they have been effective in promoting the safe accomplishment of the nuclear weapons and environmental missions of the U.S. Department of Energy. In particular, you should be prepared to comment on the Ahearne Report's recommendations on external regulation of DOE nuclear activities, and on the efficacy of all legislated DNFSB functions, including DNFSB Recommendation 94–1."

In our testimony today. we will first attempt to summarize the Board's progress in fulfilling its public health and safety oversight responsibility for the nuclear weapons and environmental missions of the DOE.

STATUTORY MISSION OF THE BOARD

The Board's enabling statute, 42 U.S.C. § 2286, requires the Board to review and evaluate the content and implementation of health and safety standards including DOE's Orders, rules, and other safety requirements relating to the design, construction, operation, and decommissioning of DOE's defense nuclear facilities. The Board must then recommend to the Secretary of Energy any specific measures, such as changes in the content and implementation of those standards, that the Board believes should be adopted to ensure that the public health and safety are adequately protected. The Board is required to review the design of new defense nuclear facilities before construction begins, as well as modifications to older facilities, and to recommend changes necessary to protect health and safety. Board review and advisory responsibilities continue throughout the full life cycle of facilities, including shutdown and decommissioning phases. The Board is also required to investigate any event or practice at a DOE defense nuclear facility which it determines has adversely affected or may adversely affect public health and safety.

The Board has also undertaken the added responsibilities mandated by the National Defense Authorization Act for Fiscal Years 1992 and 1993 (Public Law 102–190) which amended the original law. These amendments, which added the assembly, disassembly, and testing of nuclear weapons to the scope of the Board's oversight responsibilities, increased the Board's workload substantially.

The Board has been in operation for 6½ years. The Board has assembled a talented staff with extensive experience in nuclear-chemical processing, conduct of operations, nuclear safety analysis, conventional and nuclear explosive technology and safety, nuclear weapons safety, storage of nuclear materials, nuclear criticality safety, and waste management and environmental restoration. Two full-time site representatives are stationed at the Pantex site to oversee the safe assembly and disassembly of nuclear weapons. Two site representatives are assigned to the Hanford Site to monitor waste characterization and stabilization and two full-time site representatives are stationed at the Rocky Flats Environmental Technology Site to monitor DOE's stabilization and storage of the large plutonium inventory at the site.

The terms of the statute setting up the Defense Nuclear Facilities Safety Board (Board) gave clear guidance of what Congress had in mind for the Board to do, and the way it was to operate. Oversight with action-forcing powers was chosen instead of making the Board a regulator. Congress expected the Board's oversight to have many of the same positive results as regulation; that is, assure that the Department of Energy was implementing a program for the safe management of the production and use of defense nuclear materials, a program that provides reasonable assurance of no undue risk to the workers and the public, and protects the environment. Congress was well aware that DOE had issued safety policies and standards of good practices. However, Congress was also aware that they needed upgrading and that DOE and contractor operations in the past had left a residual of much contamination in buildings and the surrounding environment. DOE's problem appeared to be more one of failure to establish clear expectations by DOE of its contractors and to build safety compliance into the fabric of work planning and execution.

The Board's efforts in the past 6 years have been focused upon the examination of the standards identified by DOE as codes of good practices, the manner in which DOE defines for its contractor's what is expected of them in the performance of DOE's mission. and how such expectations once established as requirements are enforced. These elements are basic to any safety management program whether internally or externally driven. The most significant deficiencies noted by the Board in these basic elements have been communicated to DOE via the recommendation process set forth in our authorizing legislation. These recommendations not only describe the perceived deficiency, but also provide guidance as to what the Board believes is advisable for a solution. Details of plans for addressing the issues identified through the recommendation process are then submitted by the Secretary for Board approval. The Board follows the progress of the required action program until the planned action has been completed. To date the Board has issued 33 sets of recommendations containing 147 specific recommendations. These will be discussed in more detail later.

Not all Board action-forcing activities lead to formal recommendations. The Board's assigned functions also include the review of design, construction, operation, and decommissioning of defense nuclear facilities. For such activities the Board's charter allows it to satisfy a real need for DOE to get on with its work with a minimum of delay due to external oversight. The Board through assignment of our staff to monitor and review work, whether it is design, construction or readiness preparations for operations, has been able to keep its reviews in sync with DOE activities. Technical concerns that arise are frequently resolved by the technical staffs of DOE, the Board, and contractors without the need for action-forcing measures by the Board. If the Board determines there are unresolved safety issues that require resolution before proceeding, the Board can define the issue for the Secretary and recommend resolution before proceeding. In the case of operations at Rocky Flats. Congress specifically required the Board to certify readiness before resumption of operations could begin.

In addition to our reviews of the basic elements and structure of DOE's safety management program, the Board has given priority attention to facilities and, activities believed to represent the greatest safety risks—mainly those that now comprise the residual of the nuclear weapons complex devoted to stewardship, maintenance and surveillance of nuclear weapons, the storage of strategic and highly radioactive materials and the stabilization of hazardous residuals of weapons production. For those facilities and operations representing significant hazards (e.g., those classified as hazard classes 1 and 2), the Board is pressing DOE to develop safety management programs that result in clearly defined systems and components important to safety, the technical specifications that define limiting conditions for operation, and the infrastructure needed to support maintenance and safety in operation. This has already been done in a number of cases. The extension of this effort to all high risk facilities is the thrust of the Board's latest Recommendation 95–2. The end goal is to have safety management programs that are well defined but tailored to the diverse operations that make up the DOE complex, the hazards-specific nature of the activities involved and the aged nature of the facilities in which such operations must be conducted.

With respect to decommissioning of defense nuclear facilities, the Board has tended to focus its activities on those facilities in transition to cleanups or environmental restoration under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA). A substantial number of such facilities require considerable effort to remove radioactive materials, or otherwise deactivate them, before they can be considered safe for non-time critical remedial action. CERCLA and RCRA statutes are administered by the Environmental Protection Agency (EPA) and the States. The Board is working cooperatively with EPA and the States to smoothly effect this transition. The Board has recently signed a cooperative agreement with the State of Colorado, EPA and DOE with respect to activities at the Rocky Flats Environmental Technology Site.

ADDITIONAL REGULATION OF DOE'S DEFENSE NUCLEAR FACILITIES

The Ahearne Report is a Report of The Advisory Committee on External Regulation of Department of Energy Nuclear Safety generally referred to as the Ahearne Committee. after one of the co-chairmen. The title of the report is *"Improving the Regulation of Safety at DOE Nuclear Facilities."* As the title implies. the Department of Energy already is regulated in most all of its activities by State and Federal Environmental Protection Agencies and by the Department of Transportation. By law it must comply with OSHA requirements and the nuclear safety of its weapon mission activities are under the external oversight and action-forcing powers of the Defense Nuclear Facilities Safety Board.

What advantages will accrue from adding another level of regulatory authority over DOE's activities? Justification for additional regulation is based on two suppositions. both of which we believe to be wrong.

1. That it will enhance DOE credibility with the public, and
2. That it will improve safety.

We suggest the public's trust in DOE will not increase by setting up another Federal Government agency here in Washington. DC to regulate its activities. whether the agency be the Defense Nuclear Facilities Safety Board or the, US. Nuclear Regulatory Commission (NRC) or some combination of the two operating in a formal regulatory manner. Rather than by having more external regulation imposed upon it. DOE's credibility will improve by performing its responsibilities in an efficient and creditable manner. We believe DOE has made notable progress as regards cooperation and openness particularly in the formation and utilization of local citizen advisory boards. Trust and credibility are developed at the local levels. not by layering Government agencies.

Will more regulation improve safety? If so, at what additional cost? The Ahearne Report acknowledges that regulation would require additional start up costs. but asserts that savings will result from having fewer DOE employees assigned to environmental safety and health issues. The NRC has advised that if it is to assume regulatory responsibility for DOE. the Commission would need an additional 1,100 to 1,600 full-time employees and an increase of $150 million to $200 million per year in its budget. How much of that addition in personnel and dollars cost would DOE save? We know of no organization. In Government or in private industry that reduces personnel or response costs when additional regulatory authorities are imposed on it. The opposite occurs. The Ahearne Report does not set forth how savings will accrue from its recommendation. nor does it specify what safety improvements will occur and how.

The Ahearne Report, in the interest of improving safety, would have OSHA formally regulate DOE. requiring many more full-time inspectors to cover thousands of DOE facilities. OSHA complains that it doesn't have sufficient inspectors to adequately meet its current responsibilities. In DOE nuclear defense activities. the actual work is done by employees of commercial organizations such as Westinghouse, Kaiser, Bechtel, etc. The managements of those companies are fully knowledgeable of OSHA requirements through their commercial activities. DOE owns the facilities and its line management should be alert to their obligations and make certain the contractors meet them. In some cases—such as at Rocky Flats—DOE doesn't directly manage the working contractors, but uses another commercial contractor to manage or "to integrate" those contractors who do the actual work. Thus, to implement the Ahearne Recommendation. The Federal Government could end up with an OSHA Government agency worker enforcing safety rules at a Federally owned work place through a DOE employee who then turns to the integrator contractor company to force the contractor doing the actual work to correct safety deficiencies or violations. The practical solution to the problem is to have DOE site personnel trained in OSHA safety regulations and then enforce those safety requirements on their contractors. who are required to comply with these requirements in their normal commercial work.

The Ahearne Report makes a very pertinent and important observation when it notes that "No outside authority or authorities could or should be considered a substitute for an effective internal safety management structure and program." Regulation by itself cannot assure safety is a maxim long known by those experienced in hazardous occupations.

A number of individual recommendations in the Ahearne Report, in our opinion. are directed toward the ability of intervenors to delay the construction or operation of needed facilities and other activities through use of the court of law and extended appellate reviews and if implemented would increase this ability. The Ahearne Report recommended legislative changes to the Atomic Energy Act that would provide greater intervention rights than that which exists in the civilian nuclear field to those opposed to DOE's production and uses of special nuclear materials for defense purposes.

Another recommendation of the report is to grant authority to the States to set more stringent facility safety standards providing those standards "do not unduly hinder DOE in performance of its missions." Who is to determine what is unduly? Lawyers will have a "field day" with that one in the courts up to and including the Supreme Court before a resolution is reached. States will be competing with each other as to which one is more conservative in nuclear safety issues at DOE nuclear defense facilities.

The Report barely acknowledges the existence of the national security elements of the Atomic Energy Act. and it does not explain how national security will be impacted by the actions of an independent regulatory agency.

When Secretary O'Leary, in January 1995, created the Advisory Committee on External Regulation of Department of Energy Nuclear Safety and appointed Dr. Ahearne to be co-chairman. She requested the Defense Nuclear Facilities Safety Board to participate in the work of the Committee. Mr. Joseph DiNunno, a member of our Board and a recognized nuclear safety expert knowledgeable in environmental regulatory matters. volunteered. Throughout the past year, Mr. DiNunno devoted a great deal of time and effort to the undertaking. Mr. DiNunno and a number of others who participated in the study did not concur in many of the recommendations set forth in the report.

We have attached a copy of Mr. DiNunno's separate views as Attachment III. Also in view of his special insight as to the workings of the Committee under the chairmanship of Dr. Ahearne, we have attached a copy of a presentation Mr. DiNunno recently made to the local section of the American Nuclear Society, which we believe you will find to be both thoughtful and informative (Attachment IV). Mr. DiNunno's basic conclusion after 1 year of intense involvement and careful consideration of the issues examined by the Committee is that ". . . taken as a whole the recommendations represent a regulatory model that will exacerbate DOE's problems, not help solve them."

RECOMMENDATIONS TO THE SECRETARY OF ENERGY

During the past 6 years of operation, the Board has advised the Secretary of Energy and other senior DOE officials on a wide variety of specific health and safety matters within the DOE weapons complex. In general, the Board's Recommendations have emphasized:

- identifying, assessing the adequacy of, and applying appropriate design and operating standards;
- selecting, training, qualifying, and retaining technically competent operations, maintenance, and technical support personnel;
- applying the principles of systems engineering in evaluating the design of new facilities and in upgrading existing facilities;
- conducting timely and comprehensive Operational Readiness Reviews (ORR's);
- improving the Department's radiation protection program, including measures for control of radioactive sources and contamination;
- assigning well-qualified DOE Facility Representatives at defense nuclear facilities;
- resolving expeditiously many pressing issues surrounding the stabilization and safe storage of fissionable materials and production residues;
- integrating various modalities for binding requirements, such as Rules, Orders and Contract provisions; and
- establishing well-defined safety management programs, tailored to the specific hazards of the work, as a requisite for authorization to conduct such work.

Sixteen sets of recommendations have been fully closed or subsumed by later recommendations. The remaining seventeen are in various stages of implementation. Attachment I lists key milestones associated with the Board's Recommendations.

The Board's Recommendations result from: (1) site visits by the Board, staff, and outside technical experts; (2) review of documentation concerning particular problems at the site; (3) review of staff or Board contractor reports in appropriate cases; (4) briefings by DOE officials and DOE contractors; and (5) deliberation and technical review by the Board. In 1995 alone, the Board Members, its staff, or its contractor experts made 173 site visits to DOE's defense nuclear facilities. These visits focused primarily on selected facilities that both the Board and DOE consider to be most important to DOE's mission, primarily those the Savannah River Site, the Pantex Plant, the Hanford Site, the Rocky Flats Plant, the Idaho National Engineering Laboratory, the Oak Ridge Y–12 Complex, the Los Alamos National Laboratory, and the Nevada Test Site.

In addition, since its formation the Board has held a total of 49 public meetings/briefings, the majority of which were held in the vicinity of selected DOE defense nuclear facilities, to listen to DOE managers, their contractors, and the public, and discuss the status of ongoing health and safety reviews.

HEALTH AND SAFETY IMPROVEMENTS RESULTING FROM BOARD ACTIONS

During 1995, a number of Board initiatives, some undertaken in previous years, were completed or advanced significantly. A representative sample of these accomplishments is summarized below.

- The Board issued a landmark recommendation urging DOE to improve the process used in development, review, and approval of authorization bases for facility operation or conduct of potentially hazardous activities, based on two pivotal technical reports prepared by the Board (Recommendation 95–2).
- Based on the guidance contained in the technical reports supporting Recommendation 95–2, the Board's staff completed assessments of authorization bases for a representative sample of high priority defense nuclear facilities and activities, demonstrating the soundness and adaptability of the concepts included in the reports and setting the groundwork for future reviews of authorization bases prepared by DOE and its contractors.
- In response to Recommendation 94–1, plutonium residues remaining from metal casting at RFETS have been successfully stabilized during the summer of 1995, and by mid-November 1995, all plutonium in contact with plastic had been repackaged.
- Also in response to Recommendation 94–1 and a Board technical report. DOE modified its previous plans for dry storage of deteriorating reactor fuel in storage basins at the Savannah River Site and is now planning to stabilize the fuel by processing it in F–Canyon.
- Largely as a result of the Board's attention to the problems associated with deteriorating fuel at the Hanford Site. DOE officials responsible for the K Basins are now focused on expeditiously stabilizing this fuel and removing it from wet storage. In addition, the K Basins now have in place most of the elements of an adequate authorization basis, including an updated Safety Analysis Report, revised Operational Safety Requirements, a

corresponding Safety Evaluation Report prepared by DOE, a standards/Requirements Identification Document, and revised facility procedures.

- As a result of Board emphasis on the need for comprehensive readiness reviews, substantial improvements were made in systems and practices at the F–Canyon and FB–Line at the Savannah River Site, leading to the timely availability of these facilities for stabilization of plutonium solutions.
- In early 1995, the Board issued Recommendation 95–1 after its staff found that many cylinders containing depleted uranium hexafluoride in outdoor storage at the three gaseous diffusion plants were handled and stored under conditions that could lead to high deterioration rates. As a result, DOE initiated a program for repairing the affected cylinders and for improving storage conditions.
- Due in large part to the Board's intensive review, agreements between DOE and the FAA have been reached that will eventually eliminate most aircraft flights over the Pantex Plant, thereby significantly reducing the risk of an airplane crash into the Plant. Board attention to technical staffing of DOE's Amarillo Area Office and the Y–12 Site Office at Oak Ridge led to hiring of a number of technically competent engineering professionals in Amarillo and of eight new technical staff members in the Y–12 Site Office, yielding substantial improvements in operations at both locations.
- In response to Recommendation 94–4, DOE took immediate steps to correct safety deficiencies at the Y–12 Plant at Oak Ridge and then validated the corrections through a formal restart process.
- The Board's staff played a substantial role in helping prepare a needed standard for storing highly enriched uranium at the Y–12 Plant at Oak Ridge. None had existed prior to the summer of 1995.
- In response to an earlier Recommendation (92–6), which called for improved guidance for timing, staffing and content of operational readiness reviews. DOE had developed a new order and a new DOE standard. Both were revised in 1995 to respond to a number of Board comments suggesting improvements in both documents.
- The Board reviewed the safety of the Replacement Tritium Facility at the Savannah River Site, and in discussions with DOE established a basis for operating limits providing an acceptable level of safety. This process was followed in direct discharge of the Board's statutory responsibilities. A similar process is under way for the facilities being started up at Savannah River for processing high level nuclear waste to disposable forms.
- Responding to the Board's Recommendation 93–6, DOE has instituted a program to recover and preserve information vital to safety of nuclear weapons, their surveillance, and their future dismantlement. This information is, for instance, that possessed by weapons designers who have recently retired or who will retire in the near future.

SAFETY ASPECTS OF NUCLEAR WEAPONS STOCKPILE—STEWARDSHIP AND MANAGEMENT

The continuing national commitment to dismantle approximately 2,000 nuclear weapons per year has challenged and will continue to challenge the DOE weapons complex, which is experiencing a concurrent erosion of technical capability and limitation in physical plant capacity. The Board must continue to pay close attention to the safety of assembly and dismantlement activities, and to those activities needed to meet the requirements of the enduring stockpile, so as to ensure that an appropriate risk management strategy is applied while meeting national security commitments.

DOE's "stockpile Stewardship" efforts will involve nuclear research and experimental activities at the weapons laboratories and at Nevada Test Site (NTS). The Board is working with DOE and the weapons laboratories to tailor integrated safety management strategies for these types of activities. The initiation of "sub-critical experiments" at NTS in fiscal year 1996, to continue throughout fiscal year 1997 and beyond, will require additional Board oversight resources. In addition, full implementation of integrated safety management systems for research activities at the weapons laboratories is proceeding slowly, and is anticipated to require continuing Board attention.

SAFELY MANAGING SURPLUS NUCLEAR MATERIAL AND WASTE

The halt in production of nuclear weapons and materials to be used in nuclear weapons froze the DOE manufacturing pipeline in a state that, for safety reasons, should not be allowed to persist unremediated. The Board concluded in early 1994 from observation and technical discussions with others experienced in plutonium handling that imminent hazards could arise within 2 to 3 years unless certain problems are corrected. The Board was especially concerned about specific liquids and solids containing fissile materials and other radioactive substances in spent fuel storage pools, reactor basins, reprocessing canyons, processing lines, and various buildings once used for processing and weapons manufacture.

Early in 1994, the Board issued Recommendation 94–1, calling for an improved schedule for remediation of such materials throughout the complex, and specifically recommending that DOE take specific actions at several DOE sites on a high priority basis. Attachment II presents the complete text of Recommendation 94–1 to the Secretary of Energy. DOE's progress in implementing this recommendation is summarized as follows:

Stabilization of Fissionable Residues at the Rocky Flats Environmental Technology Site—In Recommendation 94–1, the Board recommended that DOE expedite its efforts to characterize and stabilize a wide variety of production residues remaining in process lines and storage containers which were continuing to degrade, creating an increasing hazard. Although the problem exists at several facilities in the defense nuclear complex, it is especially acute at the Rocky Flats Environmental Technology Site (RFETS).

During the summer of 1995, impure material remaining from metal castin, which constituted one of the highest risk sources of plutonium-bearing residues at RFETS, was successfully stabilized. In addition, by mid-November 1995, plutonium metal in contact with plastic at RFETS had been repackaged in accordance with DOE's implementation plan. Moreover, processing and safe interim storage of other plutonium residues and oxides are proceeding, albeit not on the schedule set forth in DOE's implementation plan. DOE completed the venting of 2,696 solid residue drums in December 1995, 9 months ahead of schedule. These residue drums were vented as a safeguard to prevent pressurization and flammable gas accumulation and ensure worker safety.

Nuclear Material Stabilization at the Savannah River Site—At the Savannah River Site. Recommendation 94–1 applies to stabilization of solutions containing plutonium and trans-plutonium elements in F–Canyon, plutonium metal in storage, and irradiated fuel and target assemblies in basins. In accordance with its implementation plan, DOE has expedited processing of plutonium solutions in F–Canyon and FB–Line, in addition to reassessing its earlier plans for deteriorating fuel and target material.

As part of the material stabilization effort, the Board has insisted that each facility to be used for stabilization undergo a thorough operational readiness review, including reviews of operator training and procedures, verification of equipment operability, and definition and control of the facility's authorization basis. This process has resulted in: (1) augmented Steps to protect against radioactive material release, including the isolation of an F–Canyon tank that contains highly radioactive americium and curium; (2) modifications to the FB–Line ventilation system to provide exhaust filtration through a sand filter; (3) additional controls in F–Canyon and H–Canyon to prevent an explosion similar to the accident at the Tomsk facility in the former USSR; and (4) reductions in the size and number of contaminated areas in both F–Canyon and the FB–Line.

Spent Nuclear Fuel at the Savannah River Site—In Recommendation 94–1,the Board also urged DOE to expedite processing of deteriorating reactor fuel stored in basins at the Savannah River Site. In its implementation plan. DOE committed to begin stabilizing this aluminum-clad highly-enriched fuel by November 1996. Only weeks after these revised plans were issued, one of the storage containers began to leak, demonstrating anew the lack of stability of the fuel under the prevailing conditions of chemical corrosion and attack.

The Board identified problems with pursuing dry storage plans for aluminum clad highly-enriched uranium fuel, and pointed out certain rapidly corroding nondefense fuel that had been previously predicted by DOE to remain stable for another 10 years. In a subsequent technical report, DNFSB/TECH 7, *Stabilization of Deteriorating Mark 16 and Mark 22 Aluminum-Alloy Spent Nuclear Fuel at the Savannah River Site,* the Board's staff established the technical basis for concluding that stabilization of this fuel by chemical separation is the better alternative.

The Board's attention to this matter caused DOE to refocus its previous dry storage plans, and, as a consequence, DOE now is examining means to expedite conversion of the fuel into more manageable components (i.e., feed for the Defense Waste Processing Facility and low-enriched uranium).

Had the Board not alerted DOE to the rapidly corroding but incorrectly categorized fuel, it is likely that DOE would have continued wet storage for at least the next decade, based on its assumption of stability.

Spent Nuclear Fuel Stored in the K Basins at the Hanford Site—At the beginning of 1994, DOE pursued a vaguely defined course of action to resolve recognized safety issues with severely deteriorated spent fuel stored in leaking basins located next to the Columbia River. A Tri-Party Agreement involving DOE, the Environmental Protection Agency, and the State of Washington had been reached to remove the fuel from the basins by the end of the year 2002. DOE–HQ expressed reservations about the feasibility of meeting the agreed-upon completion date. Meanwhile, the contractor expended considerable resources, but made little progress on an interim effort to encapsulate (in the basin water) all of the fuel in the K–East Basin.

In early 1994, the Board pointed out the lack of a technical basis for DOE's planned course of action and urged DOE to identify engineering alternatives, the criteria for selecting an alternative, and the anticipated radiological consequences of proposed actions. In May 1994, the Board issued Recommendation 94–1, specifically recommending that the program be accelerated to place the deteriorating reactor fuel in a stable configuration for interim storage until an option for ultimate disposition is chosen.

As a result of intense interactions between DOE and the Board's staff, DOE's implementation plan committed DOE to begin fuel removal by the end of 1997, and to complete fuel removal by December 1999. In addition, this implementation plan reflected results of recently performed engineering studies identifying stabilized dry storage as the best interim storage for the type of fuel stored in the K–Basin.

The Board's involvement with these issues resulted in a technically sound path forward and an expedited schedule for resolving the safety and environmental vulnerabilities associated with the leaking fuel. The Board was instrumental in steering both the contractor and DOE toward a system where all activities associated with the stabilization of the fuel in the K–Basins are conducted on a separate project basis.

Spent Nuclear Fuel Stored at the Idaho National Engineering Laboratory—During 1993, the Board highlighted the weaknesses in actions by DOE to develop a systems engineering plan to address the spent fuel problems, and noted that actions at Idaho to address problems with severely corroding fuel were neither timely nor in accordance with proper procedures. DOE responded by preparing a systems engineering plan for the spent fuel program and taking corrective actions at INEL. This progress at Idaho was acknowledged in the Recommendation 94–1.

Operational Readiness Reviews at the Idaho National Engineering Laboratory—Late in 1992, questions from the Board's staff prompted DOE to conduct a more comprehensive operational readiness review for the New Waste Calcining Facility, and led to improvements in the safety of calciner operations. Similar scrutiny was given to preparations to restart the denigrator process at Idaho, where preparation by line management and conduct of the operational readiness review adequately demonstrated readiness to restart operations. The Board believes that INEL needs to continue to make improvements in the operational readiness review process and the staff will continue to monitor their efforts.

Development of Required Standards—At the Y–12 Plant, the nation's repository for highly enriched uranium (HEU). DOE plans to consolidate much of the HEU from other sites in the complex. This will involve receipt, processing, and storage of uranium in many different forms. Historically, no standard existed for uranium storage. This past summer, DOE approved a standard for storing HEU at the Y–12 Plant. The Board's staff played a key role in the creation of this standard through on-site reviews and detailed technical comments on the initial drafts.

The Board has also actively promoted the development of two standards for safe storage of plutonium. Subsequent to issuance of Recommendation 94–1, two such DOE standards have been issued, one applying to 50-year storage of plutonium metal and oxide, and another covering 20-year storage of plutonium-bearing scraps and residues. DOE is procuring a new system of equipment for stabilization and packaging of plutonium metal and oxide to meet the 50-year storage standard. Initial installation of prototype equipment at Rocky Flats is scheduled for 1996, with probable future deployment at Hanford and Savannah River. Thank you for the opportunity to report to you on the Board's progress in meeting the challenges before us. We will be happy to answer any questions you may have.

ATTACHMENTS

ATTACHMENT I—Recommendations Tracking Calendar.

ATTACHMENT II—Board Recommendation 94–1.

ATTACHMENT III—Additional Views of Joseph J. DiNunno Relative to The Report of the Advisory Committee on External Regulation.

ATTACHMENT IV—External Regulation of DOE Nuclear Safety. A Different Point of View, Joseph DiNunno. February 27, 1996.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD
1990 RECOMMENDATIONS CALENDAR

2/22/96 Update

DNFSB Recommendation Number, DOE Site Involved And Subject In Brief	Date Deliver-ed To Sec'y Of DOE	Date Recomme. Appears In Fed. Register	Public Comments To Rec. Deadline Date	Sec'y Of DOE Response Due Date	Date Response Appears In Fed. Register	Deadline For Public Comments To SOE Response	Imple-menta-tion Plan Due Date	Date Imple-menta-tion Plan Is Received	Public Hearing Date
90-1 Savannah River, Reactor Operator Trng.	02/22/90	03/01/90	03/31/90	04/15/90	04/13/90	05/14/90	07/12/90	3/ 07/13/90	06/28/90 CLOSED 10/27/92
90-2 All Sites Standards	03/08/90	03/14/90	04/13/90	1/ 06/12/90	06/12/90	07/12/90	09/10/90	6/ 11/09/94	CLOSED9/ 08/30/90
90-3 Hanford Future Tank Monitoring	03/27/90	03/30/90	04/30/90	05/14/90	05/23/90	06/22/90	2/ 08/13/90	08/13/90	CLOSED 05/01/92
90-4 Rocky Flats Operational Readiness Review	05/04/90	05/10/90	06/11/90	06/25/90	06/25/90	07/25/90	09/24/90	4/ 11/30/90	08/30/90
90-5 Rocky Flats Systematic Eval-uation Program	05/18/90	05/24/90	06/25/90	07/09/90	06/20/90	07/20/90	09/18/90	7/ 05/04/94	10/ 08/30/90 CLOSED
90-6 Rocky Flats Plutonium In The Ducts	06/05/90	06/11/90	07/11/90	07/26/90	07/26/90	08/27/90	10/24/90	11/30/90	11/ 08/30/90 CLOSED
90-7 Hanford Modif. To Imple. Plan For 90-3	10/12/90	10/18/90	11/19/90	12/03/90	12/11/90	01/10/91	5/ 03/04/91	8/ 10/00/94	

1/ Secretary's response originally due 4/29/90; Board granted 45-day extension to 6/12/90.
2/ Implementation Plan due day figured from 5/14/90.
3/ Original Implementation Plan received 7/13/90; supplemental received 2/7/91 to rectify deficiencies.
4/ Original Implementation Plan received 11/30/90; modification received 3/19/91 to incorporate revisions and changes cited by Board.
5/ Implementation Plan due date figured from 12/3/90.
6/ Original Implementation Plan received 9/17/90; due to deficiencies, DOE has submitted revisions on 11/14/91, 6/15/92, 11/24/92, 7/20/93, and 11/9/94
7/ 9/29/93 letter to DOE requesting revised IP; 9/29/93 SOE responded, will provide rev. by 10/15/93; rev. 1 IP received 10/15/93; 12/10/93 letter to SOE requesting IP be rev.; 5/4/94 received Rev. 2 IP
8/ Original Implementation Plan received 3/7/91; Revision 1, dated 12/92, received 9/3/93; 5/10/94 received WHC-SP-0711 Program Plan as a replacement to IP; 12/2/94 received DOE PL-94 112 as updated IP
9/ Recommendation closed per 10/24/95 letter to SOE.
10/ Recommendation closed per 10/24/95 letter to SOE.
11/ Recommendation closed per 10/24/95 letter to SOE.

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DEFENSE NUCLEAR FACILITIES SAFETY BOARD
1991 RECOMMENDATIONS CALENDAR

2/22/96 Update

DNFSB Recommendation Number, DOE Site Involved And Subject In Brief	Date Deliver-ed To Sec'y Of DOE	Date Recomme. Appears In Fed. Register	Public Comments To Rec. Deadline Date	Sec'y Of DOE Response Due Date	Date Response Appears In Fed. Register	Deadline For Public Comments To SOE Response	Imple-menta-tion Plan Due Date	Date Imple-menta-tion Plan Is Received	Public Hearing Date
91-1 All Sites Safety Standards	03/08/91	03/13/91	04/12/91	[1] 05/13/91	05/17/91	06/17/91	08/15/91	08/16/91	**CLOSED 10/27/92**
91-2 Savannah River, Narrative For Closure Pkg.	03/27/91	04/03/91	05/03/91	[2] 05/20/91	05/28/91	06/27/91	08/26/91	08/07/91	**CLOSED 10/27/92**
91-3 WIPP Readiness Review	04/25/91	05/01/91	05/31/91	[3] 06/17/91	[3] 07/24/91	08/23/91	[3] 09/03/91	08/07/91	**CLOSED 05/01/92**
91-4 Rocky Flats Operational Readiness Review	09/30/91	10/08/91	11/07/91	[4] 11/22/91	12/10/91	01/09/92	02/20/92	11/08/91	**01/16/92 CLOSED 05/01/92**
91-5 Savannah River, Power Limits/K-Reactor	12/19/91	12/27/91	01/27/92	[5] 02/10/92	03/10/92	04/09/92	06/08/92	[5] 01/31/92	**CLOSED 02/94 ANN.RPT.**
91-6 All Sites Radiation Protection	12/19/91	12/27/91	01/27/92	[6] 02/10/92	03/10/92	04/09/92	06/08/92	[7] 06/23/93	

[1] Originally DOE response due 4/29/91; Deputy SOE requested an extension to 5/13/91. Board approved 4/29/91.
[2] DOE response letter dated 5/14/91 and received 5/24/91.
[3] DOE response letter dated and received 7/5/91; Implementation Plan due date determined from date response was received.
[4] DOE response letter dated 11/6/91 and received 11/8/91.
[5] DOE response letter dated and received 1/31/92; response includes Implementation Plan.
[6] DOE response letter dated 2/7/92 and received 2/11/92.
[7] Per 8/5/92 letter to DOE, Implementation Plan not accepted; 1/15/93 DOE submitted revised Plan; 6/23/93 received Revision 2 Implementation Plan, dated 6/21/93; 7/2/93 letter to DOE stating Revision 2 IP was acceptable if implementation dates were revised; 5/10/94 received letter from DOE stating implementation dates were adjusted.

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DEFENSE NUCLEAR FACILITIES SAFETY BOARD
1992 RECOMMENDATIONS CALENDAR

2/22/96 Update

DNFSB Recommendation Number, DOE Site Involved And Subject In Brief	Date Delivered To Sec'y Of DOE	Date Recomme. Appears In Fed. Register	Public Comments To Rec. Deadline Date	Sec'y Of DOE Response Due Date	Date Sec'y Of DOE Response Received	Date Response Appears In Fed. Register	Deadline For Public Comments To SOE Response	Implementation Plan Due Date	Date Implementation Plan Received
92-1 Savannah River, HB-Line Oper. Readiness	05/21/92	05/29/92	06/29/92	[1] 10/14/92	10/20/92	11/06/92	12/07/92	**CLOSED 10/27/92**	**SUPERSEDED BY REC.92-3**
92-2 All Sites, DOE Facility Rep. Program	05/28/92	06/04/92	07/06/92	07/20/92	07/21/92	07/31/92	08/31/92	10/29/92	[6] 11/05/92
92-3 Savannah River, HB-Line Op. Read. Review	05/29/92	06/04/92	07/06/92	[2] 09/03/92	[2] 09/21/92	10/16/92	11/16/92	11/30/92	[2] 09/21/92 **CLOSED**
92-4 Hanford, Multi-Function Waste Tank Fac.	07/06/92	07/14/92	08/13/92	08/28/92	08/28/92	09/23/92	10/23/92	[5] 02/05/93	[7] 11/07/94
92-5 All Sites, Discipline of Operation	08/17/92	08/28/92	09/28/92	[3] 11/27/92	[3] 12/18/92	01/08/93	02/08/93	04/08/93	[3] 12/18/92 **CLOSED**
92-6 All Sites, Operational Readiness Review	08/26/92	09/02/92	10/02/92	10/19/92	10/20/92	11/06/92	12/07/92	02/04/93	[8] 04/04/94 **CLOSED**
92-7 All Sites, Training and Qualification	09/22/92	09/28/92	10/28/92	[4] 12/28/92	01/21/93	01/28/93	03/01/93	[4] 06/14/93	[9] 11/04/93

[1] 45-day extension requested. Board approved on 7/17/92; DOE response to be sent within 30 days of receipt of DNFSB HB-Line report, which was delivered 9/14/92.
[2] 45-day extension requested for response. Board approved 7/17/92; DOE response dated 9/15/92 and received 9/21/92. Implementation Plan was included; Recommendation closed per 2/94 Annual Report.
[3] 45-day extension requested for response. Board approved 10/23/92; DOE response and Implementation Plan received together; recommendation closed per 10/24/95 letter to DOE.
[4] 45-day extension requested for response. Board approved 12/2/92; 4/28/93 received DOE notice of 45-day extension for submitting Implementation Plan.
[5] Received DOE notice of 45-day extension for submitting Implementation Plan.
[6] 1/15/93 Board letter to DOE stating Implementation Plan be revised.
[7] Original Implementation Plan received 2/4/93; Due to deficiencies, DOE has submitted revisions on 3/18/94 and 11/7/94.
[8] Original Implementation Plan received 1/19/93; Received revised IP 9/17/93; Received revised IP 4/4/94, dated 4/1/94; recommendation closed per 10/24/95 letter to DOE.
[9] Original Implementation Plan received 6/14/93; Received revised IP 11/4/93 that also covered IP for Recommendation 93-3; Recommendation closed per 2/94 Annual Report.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD
1993 RECOMMENDATIONS CALENDAR

2/22/96 Update

DNFSB Recommendation Number, DOE Site Involved And Subject In Brief	Date Delivered To Sec'y Of DOE	Date Recomme. Appears In Fed. Register	Public Comments To Rec. Deadline Date	Sec'y Of DOE Response Due Date	Date Sec'y Of DOE Response Received	Date Response Appears In Fed. Register	Deadline For Public Comments To SOE Response	Implementation Plan Due Date	Date Implementation Plan Received
93-1 All Sites, Standards Utilization	01/21/93	01/28/93	03/01/93	1/ 04/28/93	04/27/93	05/10/93	06/09/93	08/09/93	2/ 08/25/93
93-2 All Sites, Critical Experiment Capability	03/23/93	03/30/93	04/29/93	05/14/93	05/13/93	06/04/93	07/06/93	09/02/93	08/10/93
93-3 All Sites, Tech. Capability in DNF Programs	06/01/93	06/08/93	07/08/93	07/23/93	07/23/93	08/06/93	09/06/93	11/04/93	3/ 11/04/93
93-4 All Sites, Env. Restoration Mgmt. Contracts	06/16/93	06/24/93	07/26/93	08/09/93	08/09/93	08/12/93	09/13/93	11/10/93	5/ 11/09/93
93-5 Hanford, Waste Tanks Char. Studies	07/19/93	07/28/93	08/27/93	09/13/93	08/31/93	09/09/93	10/11/93	4/ 01/24/94	01/25/94
93-6 All Sites, Maintaining Acc. to Nuc.Wea.Exp.	12/10/93	12/23/93	01/24/94	02/07/94	02/04/94	02/17/94	03/22/94	6/ 07/05/94	07/08/94

1/ 45-day extension requested by DOE; Board approved 3/23/93.
2/ Original Implementation Plan received 7/19/93; received amended IP that includes requested Board additions on 8/25/93.
3/ Implementation Plan also covered revised IP for Recommendation 92-7.
4/ Implementation Plan originally due 12/8/93, 12/14/93 received letter (dated 12/9/93) notifying that DOE needed a 45-day extension.
5/ 5/16/94 DOE notified Board that Item 4 of Recommendation is closed; 10/4/95 Board issued report requirement for revised IP.
6/ Implementation Plan originally due 5/18/94, 5/19/94 received letter from SOE notifying Board that DOE needed 45-day extension.

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DEFENSE NUCLEAR FACILITIES SAFETY BOARD
1994 RECOMMENDATIONS CALENDAR

2/22/96 Update

DNFSB Recommendation Number, DOE Site Involved And Subject In Brief	Date Delivered To Sec'y Of DOE	Date Recomme. Appears In Fed. Register	Public Comments To Rec. Deadline Date	Sec'y Of DOE Response Due Date	Date Sec'y Of DOE Response Received	Date Response Appears In Fed. Register	Deadline For Public Comments To SOE Response	Implementation Plan Due Date	Date Implementation Plan Received
94-1 All Sites Improved Sched. for Remediation	05/26/94	06/03/94	07/05/94	1/ 09/01/94	08/31/94	09/06/94	10/06/94	2/ 02/28/95	2/ 03/01/95
94-2 All Sites Low-Level Waste Disposal	09/08/94	09/15/94	10/17/94	10/31/94	11/08/94	11/16/94	12/16/94	3/ 03/31/95	04/10/95
94-3 Rocky Flats Seismic and Safety Systems	09/26/94	10/04/94	11/03/94	11/18/94	11/21/94	11/28/94	12/28/94	4/ 04/12/95	6/ 07/03/95
94-4 Oak Ridge Deficiencies in Criticality Saf.	09/27/94	10/05/94	11/04/94	11/21/94	11/18/94	11/28/94	12/28/94	02/27/95	02/27/95
94-5 All Sites Integ. of Safety Rules, Orders	12/29/94	01/06/95	02/06/95	02/21/95	02/23/95	03/07/95	04/06/95	5/ 07/20/95	07/25/95

1/ Response originally due 7/18/94, SOE requested 45-day extension.
2/ IP initially due 12/5/94, rec'd 12/6/94; orig. IP withdrawn 1/26/95, will be resubmitted by 2/28/95; 2/28/95 IP is acceptable with three conditions.
3/ Implementation Plan originally due 2/14/94, SOE notified Board that DOE needed an additional 45 days.
4/ Implementation Plan originally due 2/27/95, SOE notified Board that DOE needed an additional 45 days.
5/ Implementation Plan originally due 6/5/95, SOE notified Board that DOE needed an additional 45 days.

6/ 10/3/95 letter to SOE stating Board accepts IP with revised schedule for Phase I.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD
1995 RECOMMENDATIONS CALENDAR

2/22/96 Update

DNFSB Recommendation Number, DOE Site Involved And Subject In Brief	Date Delivered To Sec'y Of DOE	Date Recomme. Appears In Fed. Register	Public Comments To Rec. Deadline Date	Sec'y Of DOE Response Due Date	Date Sec'y Of DOE Response Received	Date Response Appears In Fed. Register	Deadline For Public Comments To SOE Response	Implementation Plan Due Date	Date Implementation Plan Received
95-1 All Sites Safety of Cylin. w/ Depl. Uranium	05/05/95	05/15/95	06/14/95	06/29/95	07/05/95	07/18/95	08/17/95	10/16/95	1/ 10/17/95
95-2 All Sites Safety Management	10/11/95	10/19/95	10/20/95	2/ 01/17/96	01/18/96	01/23/96	02/22/96	04/22/96	

1/ 11/1/95 Board sent letter to SOE accepting Implementation Plan.
2/ 12/1/95 SOE requested a 45-day extension for response. Board approved 12/5/95.

ATTACHMENT I

ATTACHMENT II

RECOMMENDATION 94–1 TO THE SECRETARY OF ENERGY

PURSUANT TO 42 U.S.C. § 2286A(5), ATOMIC ENERGY ACT OF 1954, AS AMENDED

The halt in production of nuclear weapons and materials to be used in nuclear weapons froze the manufacturing pipeline in a state that, for safety reasons, should not be allowed to persist unremediated. The Board has concluded from observations and discussions with others that imminent hazards could arise within 2 to 3 years unless certain problems are corrected.

We are especially concerned about specific liquids and solids containing fissile materials and other radioactive substances in spent fuel storage pools, reactor basins, reprocessing canyons, processing lines, and various buildings once used for processing and weapons manufacture.

It is not clear at this juncture how fissile materials produced for defense purposes will eventually be dealt with long term. What is clear is that the extant fissile materials and related materials require treatment on an accelerated basis to convert them to forms more suitable for safe interim storage.

The Board is especially concerned about the following situations:

- Several large tanks in the F-Canyon at the Savannah River Site contain tens of thousands of gallons of solutions of plutonium and transplutonium isotopes. The transplutonium solutions remain from californium-252 production; they include highly radioactive isotopes of americium and curium. These tanks, their appendages, and vital support systems are old, subject to deterioration, prone to leakage, and are not seismically qualified. If an earthquake or other accident were to breach the "tanks, F-Canyon would become so contaminated that cleanup would be practically impossible. Containment of the radioactive material under such circumstances would be highly uncertain.
- The K-East Basin at the Hanford Site contains hundreds of tons of deteriorating irradiated nuclear fuel from the N-Reactor. This fuel has been heavily corroded during its long period of storage under water, and the bottom of the basin is now covered by a thick deposit of sludge containing actinide compounds and fission products. The basin is near the Columbia River. It has leaked on several occasions, is likely to leak again, and has design and construction defects that make it seismically unsafe.
- The 603 Basin at the Idaho National Engineering Laboratory (INEL) contains deteriorating irradiated reactor fuel from a number of sources. This basin also contains sludge from corrosion of the reactor fuel. The seismic competence of the 603 Basin is not established.
- Processing canyons and reactor basins at the Savannah River Site contain large amounts of deteriorating irradiated reactor fuel stored under conditions similar to those at the 603 Basin at INEL.
- There are thousands of containers of plutonium-bearing liquids and solids at the Rocky Flats Plant, the Hanford Site, the Savannah River Site, and the Los Alamos National Laboratory. These materials were in the nuclear-weapons- manufacturing pipeline when manufacturing ended. Large quantities of plutonium solutions are stored in deteriorating tanks, piping, and plastic bottles. Thousands of containers at the Rocky Flats Plant hold miscellaneous plutonium-bearing materials classed as "residuals", some of which are chemically unstable. Many of the containers of plutonium metal also contain plastic and, in some at the Rocky Flats Plant, the plastic is believed to be in intimate contact with the plutonium. It is well known that plutonium in contact with plastic can cause formation of hydrogen gas and pyrophoric plutonium compounds leading to a high probability of plutonium fires.

We note that removal of fissile materials from the 603 Basin at INEL has begun. We are also following the plans for remedying several of the other situations listed. In general these plans are at an early stage. In addition, we are aware of steps DOE has taken to assess spent fuel inventories and vulnerabilities. We also note that a number of environmental assessments are being conducted in relation to the situations we have listed above. Finally, we note that a draft DOE Standard has been prepared for methods to be used in safe storage of plutonium metal and plutonium oxide.

These actions notwithstanding, the Board is concerned about the slow pace of remediation. The Board believes that additional delays in stabilizing these materials will be accompanied by further deterioration of safety and unnecessary increase risks to workers and the public.

Therefore the Board recommends:

1. That an integrated program plan be formulated on a high priority basis, to convert within 2 to 3 years the materials addressed in the specific recommendations below, to forms or conditions suitable for safe interim storage. This plan should recognize that remediation will require a systems engineering approach, involving integration of facilities and capabilities at a number of sites, and will require attention to limiting worker exposure and minimizing generation of additional waste and emission of effluents to the environment. The plan should include a provision that, within a reasonable period of time (such as 8 years), all storage of plutonium metal and oxide should be in conformance with the draft DOE Standard on Storage of Plutonium now being made final.
2. That a research program be established to fill any gaps in the information base needed for choosing among the alternate processes to be used in safe conversion of various types of fissile materials to optimal forms for safe interim storage and the longer term disposition. Development of this research program should be addressed in the program plan called for by 1 above.
3. That preparations be expedited to process the dissolved plutonium and transplutonium isotopes in tanks in the F-Canyon at the Savannah River Site into forms safer for interim storage. The Board considers this problem to be especially urgent.
4. That preparations be expedited to repackage the plutonium metal that is in contact with, or in proximity to, plastic or to eliminate the associated existing hazard in any other way that is feasible and reliable. Storage of plutonium materials generated through this remediation process should be such that containers need not be opened again for additional treatment for a reasonably long time.
5. That preparations be expedited to process the containers of possibly unstable residues at the Rocky Flats Plant and to convert constituent plutonium to a form suitable for safe interim storage.
6. That preparations be expedited to process the deteriorating irradiated reactor fuel stored in basins at the Savannah River Site into a form suitable for safe interim storage until an option for ultimate disposition is selected.
7. That the program be accelerated to place the deteriorating reactor fuel in the K-East Basin at the Hanford Site in a stable configuration for interim storage until an option for ultimate disposition is chosen. This program needs to be directed toward storage methods that will minimize further deterioration.
8. That those facilities that may be needed for future handling and treatment of the materials in question be maintained in a usable state. Candidate facilities include, among others, the F- and H-Canyons and the FB- and HB-Lines at the Savannah River Site, some plutonium-handling glove box lines among those at the Rocky Flats Plant, the Los Alamos National Laboratory, and the Hanford Site, and certain facilities necessary to support a uranium handling capability at the Y–12 Plant at the Oak Ridge Site.
9. Expedited preparations to accomplish actions in items 3 through 7 above should take into account the need to meet the requirements for operational readiness in accordance with DOE Order 548031.

ATTACHMENT III

DEFENSE NUCLEAR FACILITIES SAFETY BOARD,
625 INDIANA AVENUE, SUITE 700,
Washington, DC, December 12, 1995.

DR. JOHN F. AHEARNE (Co-Chair),
MR. GERALD F. SCANNELL (Co-Chair),
Advisory Committee on External Regulation Of Department of Energy Nuclear Safe
Washington, DC.

GENTLEMEN: I appreciated the opportunity to be a part of this study and to co tribute to the lively and thought-provoking exchanges that took place. The subje matter is certainly one that merits attention by our lawmakers, either to confir that the status quo suffices or to make changes in the national interest.

In highlighting issues, the Committee's report reveals the complexity of the existing regulatory framework relative to the Department of Energy's nuclear programs. Our deliberations on these issues showed considerable diversity of ideas as to fixes, general agreement on some broad concepts, and lack of unanimity on any number of the detailed recommendations.

I recognize the difficulty of achieving consensus on all aspects of a report of such detail, given the diversity of backgrounds and interest of Committee membership. However, I find so much of that detail at variance with my own views that I cannot endorse the report as a whole. I do endorse a number of the principal conclusions and observations.

My views with respect to the report are summarized in the enclosure. I request these views be included as a part of the report submitted to the Secretary of Energy.

Respectfully,

JOSEPH J. DINUNNO,
Board Member.

Enclosure

PREPARED STATEMENT BY JOSEPH J. DINUNNO

RELATIVE TO THE REPORT OF THE ADVISORY COMMITTEE ON EXTERNAL REGULATION

I recognize the difficulty of achieving consensus on all aspects of a report of such detail, given the diversity of backgrounds and interest of Committee membership. However, I find so much of that detail at variance with my own views that I cannot endorse the report as a whole. I do endorse a number of the principal conclusions and observations.

A. With respect to the report in general:

1. The report in too many places, in my view, shows lack of factual rigor, impartiality, and objectivity that should obtain for a report of this importance.

   a. The report too often makes claims and assertions that are judgment calls, representing viewpoints of either individuals or segments of the Committee, but not necessarily the Committee as a whole.

   b. Where the report summarizes factual information and published critiques of the Department of Energy (DOE) and predecessor agencies by impartial entities, it is quite useful and informative. The report also identifies well major issues that must be examined by the Administration and Congress, if they elect to pursue the matter of increased external regulation as the Committee recommends. However, the multiplicity of detailed solutions offered as recommendations is another matter. They reflect too often the aspirations of special interest groups. The detailed meeting records (transcripts) of the spirited exchanges that took place at the Committee's public, plenary sessions attest to considerable differences in views on so-called detailed recommendations which are offered in the report as *Committee* consensus.

2. The report targets the statutory authority given to DOE and its predecessor agencies to establish requirements for assuring radiation protection and then implementing them (self-regulation) as the major source of difficulty. The assertion is that such authority allowed mission objectives to be given greater priority than protection of the environment, and that such authority led to environmental degradation, now the subject of costly cleanup and environmental restoration efforts. That, historically, there was substantial environmental contamination of sites and production facilities, is indisputable. However, the report labors hard to make this case as the rationale for advocating external regulation, implying that *only* such a measure will assure that DOE in the future would be more constrained from perpetrating environmental damage than in the past. In evaluating this premise, I believe it important to bear in mind the following:

   a. DOE is subject today to many more statutory environmental requirements than in the pre-1980 period in which most of the conditions requiring remedial actions were created. The DOE mission today and the way it is constrained in its operations are far different from the pre-1980's DOE. The report should be read with the understanding that what the Committee really addressed was not so much whether there is to be external regulation, but rather whether there is to be MORE external regulation.

   b. Much of the fix sought by elimination of all vestiges of self-regulation by DOE has already been accomplished by environmental protection statutes.

For a large fraction of the current DOE mission (cleanup and environmental restoration), problems identified do not stem from lack of regulation but perhaps from too many regulators in overlapping roles. A large fraction of DOE's program today falls into this regulatory arena. More external regulation will further complex not simplify this problem.

c. The Committee's deliberations on external regulation centered much upon nuclear materials and their regulation under existing provisions of the Atomic Energy Act (AEA) and the Resource Conservation and Recovery Act (RCRA). Since such special materials are crucial to the sustenance of the weapons program, external regulation of their uses raises substantive issues involving and potentially affecting national security.

B. With respect to principal conclusions and observations:

Notwithstanding the above observations, there are concepts and conclusions presented in the report that I do endorse, some fully and others with qualifications. Those I wish to highlight with commentary are the following:

1. *Agree:* There is no longer any reason, in principle, to allow DOE to continue to selfregulate its nuclear activities, with the exception of certain aspects of defense nuclear facilities still required to support the weapons surveillance and stewardship program.

However: The added costs may provide a compelling reason for not so proceeding. The cost penalty to achieve change will be a function of the specifics of any external regulatory regime put in place. The value-added from additional regulation relative to the costs still remains to be established. I recognize that the Committee did not have the time or resources to analyze the costs relative to benefits of the regulatory schemes suggested in the report. However, the report has taken the position that costs for the legal changes recommended will be justified by increased safety and operating efficiencies. Such assertions without substantive supportable facts are particularly vulnerable to skepticism and discredit. It is critical in this era of Federal budget austerity to be able to demonstrate that additional regulatory schemes will generate the projected benefits in terms of increased safety of the worker and the public and do so at costs justifiable by those benefits.

Regulatory processes, including public participation opportunities such as those provided for cleanup under environmental statutes, may have to be limited for security reasons in regulation of the residual defense nuclear complex and for cleanup programs requiring expedited action. In my view some of the changes offered as recommendations in the report are likely to lead to more, not less, administrative proceedings and litigation of issues in the courts. Such implications deserve much more scrutiny than was possible within the time and resource constraints of this study.

In establishing the Defense Nuclear Facilities Safety Board (DNFSB), Congress determined that DOE defense nuclear facilities should be subject to independent, external oversight. Some form of external oversight should be retained for aspects of defense nuclear facilities not subjected to such external regulatory processes as might be decided for non-defense nuclear activities.

2. *Agree:* External regulation offers the potential for enhanced public credibility and greater stability in the framework and execution of DOE's safety management program.

However: Although increased public confidence and assurance may result, claims for significant increase in safety over a well-executed internal ES&H program with DNFSB oversight are not supported.

3. *Agree:* Both the DNFSB and the NRC are existing agencies whose current activities make them lead candidates for assuming such additional external regulatory functions the Congress may decide to authorize. Neither agency, as currently authorized and organized, is viewed to be totally suitable to administer too the perceived future needs for external regulation of the DOE.

However: The record of the Committee's deliberations has shown a strong bias by the drafters towards regulation by the Nuclear Regulatory Commission (NRC). The final report still shows some evidence to that effect although better balance has been achieved.

The single new agency concept discussed in the report represents an ideal against which possibilities for restructuring existing agencies might well be measured. The weighing of pros and cons of restructuring using either the Board or the NRC, should in my view, focus on the relative complexities of bringing one or the other closer to that ideal. On this choice, Committee members could not come to closure. My own views are that it is preferable to add to the functions and resources of the Board, a small agency, more readily adaptable and already dedicated to independent external oversight of the most hazardous of DOE nuclear programs than to divert the focus of the NRC now dedicated to regulation of the commercial industry. On this, reasonable persons might well disagree.

4. *Agree:* In moving to external regulation as a better way for assuring that basic ES&H objectives are achieved, the fulfillment of the nation's national security mission is not to be thwarted or unduly impeded. This is presented as the general sense of the Committee.

However: The fulfillment of this objective could be significantly affected by report recommendations for specific language changes to existing provisions of both the AEA and the RCRA. I do not endorse such recommendations. The implications of such changes deserve much more scrutiny than the Committee was able to provide, not only for their effects upon DOE's nuclear activities but also upon the commercial industry as well. These statutory changes include:

- Altering the basic safety mandate of the Atomic Energy Act (page 28[1]);
- Permitting state regulation of nuclear facility safety, using standards inconsistent with Federal standards (page 30*); and
- Provision for citizen suits directly against DOE and its contractors in addition to new layers of Federal regulation of DOE (Page 37*).

5. *Agree:* DOE's efforts to strengthen its internal system must continue, and any transition to increase external regulation must be carefully thought out and managed. The report underscores the need for an effective internal health and safety system and urges the Department to continue efforts already underway to clarify and strengthen that system.

6. *Agree:* Flexibility is a key attribute needed in any regulatory regime devised by an external regulator to deal with the diversity of activities and facilities that make up the DOE complex.

However: Although this attribute is recognized in the report as essential, so much of the detail presented as recommendations would deny such flexibility. (See commentary under 4 above)

Respectfully submitted,

JOSEPH J. DINUNNO.

ATTACHMENT IV

EXTERNAL REGULATION OF DOE NUCLEAR SAFETY—A DIFFERENT POINT OF VIEW

PAPER PREPARED FOR PRESENTATION TO LOCAL SECTION—AMERICAN NUCLEAR SOCIETY WASHINGTON, DC

JOSEPH DINUNNO

MEMBER: DEFENSE NUCLEAR FACILITIES SAFETY BOARD

FEBRUARY 27, 1996

NOTE: The views expressed here are those of the author and do not necessarily represent the views of the Board as a whole.

EXTERNAL REGULATION OF DOE NUCLEAR SAFETY—ANOTHER POINT OF VIEW

As a part of my confirmation consideration by the Senate Armed Services Committee in 1992, I was asked the question, "Should you be confirmed as a member of the Defense Nuclear Facilities Safety Board (Board), what would you view as your principal responsibilities to the Secretary of Energy . . .?"

My reply was as follows: My responsibilities to the Secretary of Energy will be to provide independent oversight of defense nuclear facilities with respect to nuclear safety without, in any way, assuming or unduly intruding upon programmatic responsibilities that are his (Watkins). As a Board Member, I will owe to the Secretary, independent, forthright, soundly-based advisories that hopefully will contribute in a positive way to achievement of added margins of safety for both workers on site and the public at large.

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[1] Page numbers refer to report draft dated December 1995. These may be different for the final report

As a member of the Advisory Committee on External Regulation, I found myself one of a diverse group of individuals with different agendas, different interests, and different backgrounds. It was an experience in participatory democracy with all the benefits of increased understanding and enlightenment that derives from lively exchanges among individuals with different points of view. The process is great for airing views. It is not so great for coming up with detailed solutions on complex issues. My lifetime experience has made me wary of solutions developed by committees. They generally include something for everyone. I am ever reminded of the old Aesop fable that ended with the observation that "he who tries to please everyone pleases no one."

I am not here to quarrel with the Committee structure. The Secretary of Energy chose to explore this issue for her. That was her call. However, in the context of my pledge to give her forthright and soundly-based advisories, I was not able to do so as one contributor among many. Hence, I felt compelled to include, as additional comments, my advice to look much more carefully than the Committee did at the implications of the detailed recommendations before moving forward. There is an apt expression that captures the situation; namely:

THE DEVIL IS IN THE DETAILS

I will be more explicit later, but I would like to say that one of my criticisms of the report is that it implies a greater unanimity by the Committee with respect to the recommendations that can be rightfully asserted. The Committee never really reached full accord on much of anything except that:

1. The historic past provided little cause to believe the Department of Energy (DOE) could ever self-police itself with credibility without some outside external forcing authority.
2. No outside authority or authorities could or should be considered a substitute for an effective internal safety management structure and program, and
3. Practicality considerations made enlarged roles for existing government entities preferable over new creations.

Virtually all other more detailed recommendations had constituencies, but support was anything but unanimous on most of them. This is not surprising, given the diversity of the Committee, nor cause for castigation of those with different views. However, it should give cause for DOE to review the report with caution because controversy within the Committee surely signals difficulties for DOE if it chooses to endorse the report as a whole. . . . I understand that DOE has established a group under Thomas Grumbly, Acting Under Secretary, to study the report and to develop a response plan. I have been invited to meet with the group and have indicated my willingness to do so.

In my formal comments on the report, I indicated there were parts of the report I felt to be informative and a number of the recommendations I did support. However, I believe, taken as a whole the recommendations represent a regulatory model that will exerbate DOE's problems, not help solve them. The safety problems of DOE require technical solutions—stabilization of residual wastes, clean up of contaminated buildings and sites, safe dismantlement of nuclear weapons, and safe stewardship of strategic materials. The solution offered is a cumbersome, complex, legal structure with dramatically increased potential for litigious proceedings that could impede DOE's mission and add unneeded cost to the taxpayer.

These observations are not post report reactions. I made the same or equivalent points during the Committee's deliberations. I also offered the concept I like to think of as incrementalism, if additives to external action-forcing authority are to be sought. This approach might be characterized as an engineer's approach to the problem in contrast to the legal one advocated. It is driven by a different set of premises and principles than formed the Committee's approach; e.g., the Committee established increased credibility of DOE as a main driver for a reformed regulatory structure. I believe DOE should seek greater confidence and acceptability through more solid performance rather than a spinoff of responsibilities assigned to it by Congress. Further, the public sectors to be better served are those most directly affected; namely, those living in the property to the activities that put them at risk and those called upon to foot the bill for added safety assurance measures. In keeping with this view, I would commend to DOE a different set of principles than set forth in the report to guide DOE's path forward. These are as follows:

- Attack today's regulatory problems, not those of yesteryear,
- Regulate only to the degree necessary to force the behavior sought,
- Facilitate technical solutions not construct needless process impediments,
- Allow flexibility in establishment of requirements, tailored to work hazards,

- Structure to encourage good solid safety practices, not to fear penalties,
- Minimize costs and maximize benefits,
- Minimize regulatory overlaps and duplication, and
- Encourage intra government cooperation.

The concept of establishing an added external regulatory program for the DOE nuclear complex is far more complicated than it night appear on the surface. This results both from the shear number and diversity of facilities and activities involved, the condition and age of many of them, the national security functions some of them serve, and the changing missions to which a safety management program must adjust. The Committee rightly recognized that no one regulatory concept would fit all and that neither the Board nor the Nuclear Regulatory Commission (NRC) had programs that were suitable without modification and adaptation.

Having so observed, the matter was not pursued far enough to develop more than generalities. It deserves much closer scrutiny by DOE. One way to do this is to divide the DOE nuclear complex into component parts such as shown in Figure 1 (Viewgraph) and then examine each part relative to the merits and demerits of added external regulation. Before doing so, however, it is important to understand that the often expressed statement that DOE regulates itself is misleading. DOE self-regulates today only in a limited area of nuclear materials. Regulation of the hazardous and to) toxic materials, control of some releases of radioactivity to the environment and disposal of mixed and radioactive wastes are externally regulated. (See Figure 2.) DOE today is not free to operate in the way that historically caused the contamination of sites now requiring major cleanup and environmental restoration. An examination of Figure 1 helps focus on key points at issue.

Facilities in Part I include the residual of the weapons program still required to fulfill DOE's nuclear weapons mission. Those under Part HA are high hazard facilities (radioactivity) required for safe stabilization of residuals of weapons production, waste processing and safe storage. Parts IIB, III, and IV are the major targets for cleanup and environmental restoration. Part V includes nuclear facilities that are part of the non-defense nuclear activities of DOE. Added regulation by any external agency has different implications for each of these groupings. It has been estimated that facilities total on the order of 3500 operable units targeted for cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) on the order of 300, and facilities required to support the weapons program on the order of 100.

Facilities in Part I are the residual components of DOE nuclear weapons complex still required to support the weapons program. Facilities in Part IIA (left portion) are facilities required to process and stabilize hazardous residuals of the weapon's program. They are the main targets for those who most strongly advocate external regulation. External regulation is seen by some as a vehicle for greater access to information heretofore withheld and by others as a way to gain greater intervention rights in decisions relative to the production and uses of nuclear materials by the weapons establishment. Such is the thrust of any number of the detailed recommendations pertaining to changes to the Atomic Energy Act, Resource Conservation and Recovery Act (RCRA), and the Clean Water Act.

Facilities in Parts I and Parts IIA are high hazard facilities and operations that Congress targeted for special external oversight when it established the Board in 1988. The Board was given action-forcing powers rather than regulating authority because that was deemed sufficient to achieve the behavior sought. National security considerations strongly influenced Congressional action. The Board, in its 5th Annual Report, found that no additional authority was needed to induce DOE to move forward in its safety upgrade program although that movement was not progressing as fast as the Board sought. In response to Board recommendations and in part on its own initiative, DOE this year has undertaken a number of initiatives to move toward a flexible safety management concept that embodies safety practices comparable to the commercial industry, but more adaptable to the changing missions and needs of DOE. However, the Board is not totally satisfied with the results of DOE's efforts to date to revise its safety requirements and to institionalize its safety management programs. The Board and DOE are working together to resolve the issues. The question of whether the Board has enough statutory authority to move DOE forward in a timely fashion is certainly appropriate. The Board on its own is assessing this matter as a part of its annual review and report to Congress due in early March. The Board has also been contacted by staffs of several of the Congressional Committees and is expected to address this issue of external regulation during hearings scheduled in early March.

Facilities and activities in Parts IIB, II, and IV are either to be deactivated for non-time critical cleanup or remediation under CERCLA or RCRA. These activities hardly need another regulator on the scene. DOE is not suffering from lack of external regulation. If anything it is just the opposite—too much. The Board has been cooperating with both EPA and State authorities in establishing effective working relationships. The objective is to facilitate DOE's work. (See Figure 3.)

In the case of facilities in Part V, to my knowledge there are no public pressures being brought to bear on DOE to change the self-regulatory programs that cover these. Why then change? If the Secretary so wished, DOE could seek the independent review and affirmation by NRC of its safety management programs for these facilities. DOE in the past had a "parallel review" of its developmental power reactors that possibly could be re-instituted.

In summary:

The report, in my view, does not make a convincing case for proceeding as recommended. Draconian measures are offered when simpler actions are likely to suffice.

REFERENCES

1. *Improving Regulation of Safety at DOE Nuclear Facilities,* December 1996, Report of the Advisory Committee on External Regulation of the Department of Energy
2. *Compendium: Federal Environmental Laws,* West Publishing Company
3. *Fifth Annual Report to Congress,* February 1995, Defense Nuclear Facilities Safety Board

DOE Defense Nuclear Complex

FACILITIES	LABORATORIES WEAPONS ASSEMBLY & DISASSEMBLY TESTING SURVEILLANCE & READINESS SPECIAL NUCLEAR MATERIALS	SPENT FUEL & PRODUCTION RESIDUALS EXCESS SPECIAL NUCLEAR MATERIAL	TREATMENT & STABILIZATION FACILITIES WASTE PROCESSING & STORAGE RADIOACTIVE WASTE	EXCESS FACILITIES . CUSTODIAL . DECONTAMINATION (D) . DECONTAMINATION & DECOMMISSION (D&D) . (D&D PLUS ENV. RES.)	OPERABLE UNITS RCRA & CERCLA . (D&D PLUS ENV. RES.)	REPOSITORIES . HL-W . LL-W . MIXED . TRU
FUNCTIONS	STEWARDSHIP/NATIONAL SECURITY & DEFENSE		TREATMENT & STABILIZATION SAFE STORAGE	CUSTODIAL & D&D	ENVIRON-MENTAL RESTORATION	WASTE DISPOSAL
	PART I		PART II		PART III	PART IV

FIGURE 1

DOE Non-Defense Nuclear Complex

FACILITIES	RESEARCH/ TEST REACTORS NATIONAL LABORATORIES UNIVERSITY LABORATORIES
FUNCTIONS	ENERGY RESEARCH ENVIRONMENTAL RESTORATION RESEARCH
	PART V

FIGURE 1-A

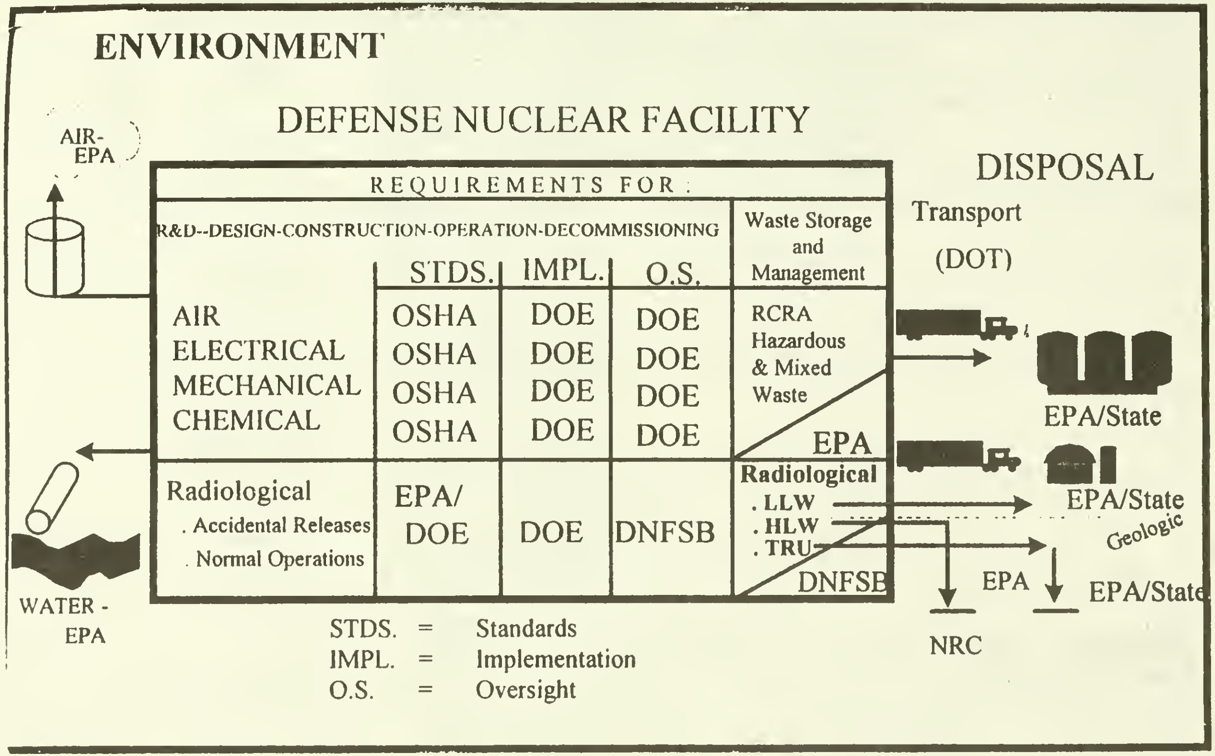

FIGURE 2

DUE TO THE COMPLEXITY OF THE ISSUES SUMMARIZED IN THIS FIGURE, IT MUST BE READ IN CONJUNCTION WITH THE FULL TEXT IN PART II, SECTION IV D.1.

DEPARTMENTAL AND AGENCY ROLES AND RESPONSIBILITIES FOR ACTIVITIES IN THE INDUSTRIAL AREA AT RFETS

DOE DIRECTS AND MANAGES ALL ACTIVITIES AT RFETS

MATERIAL/ WASTE ACTIVITY	RADIOACTIVE MATERIALS SNM, TRU, Byproduct	LOW LEVEL RADIOACTIVE WASTE	SOLID/LIQUID MIXED TRU WASTE (RCRA Waste)	LOW LEVEL MIXED WASTE (RCRA waste)	HAZARDOUS AND SOLID WASTE	†CERCLA/RCRA MATERIALS IN ENVIRONMENT
Operations and Processing	DNFSB Primary CDPHE Review and Comment	DNFSB Primary CDPHE Review and Concur	CDPHE Primary DNFSB Review and Concur	CDPHE Primary DNFSB Review and Concur	CDPHE Primary	CDPHE Primary
Storage, On-Site Transport, and Decontamination (unassociated with decommissioning)	DNFSB Primary CDPHE Review and Comment	DNFSB Primary CDPHE Review and Concur	CDPHE Primary DNFSB Review and Concur ‡	CDPHE Primary DNFSB Review and Concur	CDPHE Primary	CDPHE Primary
Deactivation including removal of SNM stored and contained materials and waste	DNFSB Primary CDPHE Review and Comment	DNFSB Primary CDPHE Review and Concur	CDPHE Primary DNFSB Review and Concur	CDPHE Primary DNFSB Review and Concur	CDPHE Primary	CDPHE Primary
Final disposition, or disposal within Colorado	DNFSB Primary CDPHE Review and Comment ††	CDPHE Primary DNFSB Review and Concur	CDPHE Primary DNFSB Review and Concur	CDPHE Primary DNFSB Review and Concur	CDPHE Primary	CDPHE Primary
Decontamination of residual contamination of fixed structures	CHPHE Primary EPA Review and Comment DNFSB Review and Comment	CHPHE Primary EPA Review and Comment DNFSB Review and Comment	CHPHE Primary EPA Review and Comment DNFSB Review and Comment	CHPHE Primary EPA Review and Comment DNFSB Review and Comment	CDPHE Primary EPA Review and Comment	CDPHE EPA Review and Comment
Dismantlement and Demolition	CHPHE Primary EPA Review and Comment DNFSB Review and Comment	CHPHE Primary EPA Review and Comment DNFSB Review and Comment	CHPHE Primary EPA Review and Comment DNFSB Review and Comment	CHPHE Primary EPA Review and Comment DNFSB Review and Comment	CDPHE Primary EPA Review and Comment	CDPHE EPA Review and Comment

Decommissioning (DOE/EPA Policy)

† EPA retains final signature authority on the "record of decision" for final selection of remedialalternative, and DNFSB provides comment in areas of expertise upon request.
†† Review and Concur if final disposition or disposal is in the State of Colorado.
‡ DNFSB has statutory oversight responsibility for nuclear waste storage. 42 U.S.C. § 2286g(2).

Legend

CDPHE Primary EPA Secondary DNFSB Secondary	CDPHE Primary DNFSB Secondary	DNFSB Primary CDPHE Secondary

Senator KEMPTHORNE. Mr. Conway, thank you very much. I appreciate how you addressed specifically a number of the issues we have before us. That was very helpful.

What I would like to begin now is a question period, and each of us will take 5 minutes, and if necessary we will do more than one round so we can get any issues we would like to discuss.

Let me begin perhaps with a philosophical question to both of you. I would just be interested in your perspective, because again—you saw that the Senate approved the budget. I think we are all dedicated to the fact that we acknowledge there is a problem, an absolute problem with nuclear waste, and we have to deal with it. It is not a question of whether we are pronuclear or antinuclear. It exists.

And yet there are some in Congress that perhaps do not have the same sensitivity to it that we do. We call it the environmental management program, EM. It sounds very nice. Should we change that name? Should it be the nuclear waste cleanup account? Should we somehow make it very clear what we are dealing with here? I am asking you to help me to figure out how we sell this whole concept.

Mr. GRUMBLY. Well, there are a lot of competing theories about this. One thing you are going to see when we send up the 1997 budget is that the entire Rocky Flats account is going to be in the environmental restoration program, and that is because at least in some quarters it is much easier to explain, believe it or not, the environmental restoration component of this than it is some of the more, what to many people seem to be esoteric issues involving materials like plutonium, spent nuclear fuel, and that sort of thing.

I think we have as a society and as a Government, and particularly in the executive branch, not done a very good job of educating people about radioactivity, about its relative risk compared to chemical hazardous wastes.

There are many chemical wastes that roll up and down the railroads of the United States every day that are more dangerous than some of the radioactive wastes, but until we meet our responsibility for educating people and reaching out, and that is why I think involving people around our sites is so important, as Mr. Conway indicated, it is extremely important that we develop information among a cross-section of people and not simply activists on both sides of issues in the society so that more people have an understanding about this problem.

I guess I feel in my heart that the description of this as an environmental program is apt. What we are doing is converting a program that essentially won the day for the Cold War, and turning, essentially, swords into plowshares. I cannot think of a more apt description of that than environmental, but I agree with you that we need to do a much better job in conveying to people what the particular pieces of this program are so that we can attract adequate funding.

I am not sure calling it a nuclear waste cleanup program attracts any more support to it in certain quarters than not. The one thing we have done over time is to say that this is the weapons cleanup program, because there are a lot of people who can resonate to the conversion that we have made from having to build these weapons to cleaning up afterwards, and perhaps that would make more sense.

I think the best thing that attracts support, though, and then I will stop, is really where we started this hearing. If myself, my colleagues, my successors, can come into rooms like this in forums around the country and demonstrate that we are achieving results with this money and explain those results in a relatively common sense way to people, I believe that we will get the support of the Congress and the American people. I do not think there is any public relations program that will do that for us.

Senator KEMPTHORNE. Thank you. Mr. Conway.

Mr. CONWAY. There are two approaches. That is, the environmental cleanup, remediation of the land, the cleanup itself. The Board is coming from the other end. We are in the process now of making certain, from a safety point of view, that the weapons being disassembled are being disassembled safely, and we are talking 2,000 nuclear weapons per year to be disassembled. That is the goal. We are talking maybe 10 years of this work. That is assuming DOE meets their goal.

Some of these weapons were not designed to be manually disassembled, but they have to be. They are being disassembled. So that is part of our work, to make sure that is done safely.

Then we next have the problem, as I mentioned, of the stabilization of materials that are out there now from a safety point of view. Long before you get to decommissioning a facility, before one gets to really clean up a particular facility, one has got to put the material that is in there in a stable form.

Thereafter, once you get it in a stable form, and you can be sure of that—and we are talking about, when it is stabilized, that is for 50 years. We will not have to treat it again.

And then comes the question, of decommissioning. This is where the Defense Board by law is required to review the decommissioning. When DOE starts the decommissioning of these buildings, for example, their ventilation systems, we do not know what is in them, and it has to be done very, very carefully.

Thereafter, we move into the environmental restoration. The EPA moves in and begins to take responsibility. In the meantime, the States also have a responsibility for environmental matters, they definitely have a responsibility, as they see it, to assure things are done safely as we get into the remediation phase. This is one of the reasons we are trying to work closely with the States and their safety people, as well as with EPA as we phase into the remediation, but we are up in the front part of that evolution.

Senator KEMPTHORNE. Let me then just ask Mr. Grumbly, the fiscal year 1996 congressional conference report provided $5.557 billion in the budget authority, considerably below the request. You were also required to use, I believe it was $450 million in carryover funds.

So what impact has this had upon both your operation in 1996 and also what the 1997 request will be, and what about these carryover funds? Have they now been wrong out? Are they gone, or is that still something that you can turn to?

Mr. GRUMBLY. First I would say it is my time to get out the green eye shade, because part of this is an accounting problem.

The problem is not simply the money that we carry over. We have from this committee and the committee in the House the ability to have no-year funding, a tremendously powerful tool so that we do not have to engage in what public agencies do all the time, which is ring the bell in the last month of the fiscal year and spend all the money right away.

But in this program, because most—as in DOE as a whole because—most of the money is spent by contractors. What we do is, we obligate the money to the contractors. The contractors then spend that money out, so the problem comes when the money is obligated but where we have not received the bills for the work yet.

It is as though, when you get an estimate from a contractor to put a wing on your house, you sign a contract for $25,000. That money is obligated at that point, if you have signed the contract, but you actually have not spent it until the contractor actually gives you the bill at the end of the process for all of the things that are happening. The difference between the time that elapses between when we actually obligate the money and when we actually pay it is something called the uncosted balances.

So they are technically not carryover funds in the sense that we have not used them. They are moneys that have been obligated for real public purposes in each budget. But because of either regulatory problems where we have not been able to get permits, where we have situations in which we have had to do redesign problems, all the money is not spent.

Those were accumulated over the first few years of this program. In 1995 and 1996, we drew down the balances, these uncosted balances from $2.3 billion to just over $1.5 billion. That $1.5 billion is in line with informal General Accounting Office guidelines.

We believe that the Congress in 1996, in taking not $450 million but $675 million in uncosted balances, took too much. As we put our 1997 budget together, we took a look at exactly where we are within the GAO guidelines. What we came up is that we are still about $100 million to $150 million over those guidelines, so the budget that you will see from us on March 18 will propose a spending authority that is in excess of $6 billion offset by $150 million in these uncosted balances.

That $150 million is only half the amount that we propose. It is a fifth of the amount that the Congress took last year, and with that, we will have the best uncosted balance amount of any agency in the DOE, and well within the GAO guidelines.

But you should not kid yourself. This problem, which is an accounting problem in many respects, is not as though we have a lot of free money hanging around. When we have to apply uncosted balances, we are essentially taking money from the future and spending it now, so something gives. It is robbing Peter to pay Paul.

The only reason why we have really engaged in making proposals about this is we have to demonstrate to folks that our numbers are well in line with where the rest of the Department of Energy is, and well in line with where the Federal Government is.

Indeed, because I think this program in its earlier years developed a reputation for inefficiency in the 1989 to 1993 period, we have had to especially pound on that point to make sure that your colleagues not only in the Senate but particularly in the House of Representatives get the fact that we are tightening up in this area.

I hope that is at least a reasonably clear explanation of what is a pretty difficult issue to convey.

Senator KEMPTHORNE. I appreciate it very much.

Senator Exon.

Senator EXON. Mr. Chairman, thank you very much. I am sorry to advise you that I must leave shortly. I have additional questions that I will want to ask this panel and the succeeding panel, and I would ask that whatever I did not cover at this time be included in the record for written replies.

Senator KEMPTHORNE. Absolutely.

Senator EXON. Let me move right along, Mr. Grumbly. These first two questions are related, so I am going to ask them both and then give you a chance to answer, and then maybe that way we can save some time in your answer.

Mr. Grumbly, as you know, the committee only reluctantly authorized payments or penalties at Rocky Flats in the fiscal year 1996 Defense Authorization Act. Do you expect the funds provided for the current fiscal year will be adequate to meet the requirements of all current consent decrees and cleanup agreements, or is the Department likely to be sued again for noncompliance? That is for 1996.

A similar question for 1997. When your fiscal 1997 budget request is finally sent over, as you have referenced today, will it contain enough funding to permit compliance with all current consent decrees and agreements, or can we expect the Department to be sued for noncompliance on at least some of those agreements? If you do anticipate suits being filed, is this symptomatic of the need for congressional relief, or other legislation that you would recommend to this subcommittee?

Mr. GRUMBLY. Senator, I do not expect in 1996 to be sued for noncompliance based upon budgetary considerations. I cannot guarantee that we will not fall down some place at some point, but I do not believe it will be because of budgetary considerations.

With respect to 1997, it is going to be a stretch, and we will have to negotiate with the States and Federal agencies that are involved, but we do have, and we do believe that we have enough money in the budget, assuming we can work reasonably with the States as we did in 1996, where we will not be sued on the basis of how much money we have.

Senator EXON. Thank you very much.

The next question I would address to both you, Mr. Grumbly, and you, Mr. Conway.

Mr. GRUMBLY. Senator, if I could amend my statement just in this regard, that is, assuming the President's budget is passed in 1997.

Senator EXON. Mr. Grumbly and Mr. Conway, we were informed earlier this week that Secretary O'Leary intends to be present at Savannah River next Monday, which is March 11, I believe, when the defense waste processing facility, or DWFP, begins its operation.

At about the same time, the committee received notification from the Defense Nuclear Facilities Safety Board of a public hearing it plans to hold at 5:00 p.m. on the same day, Monday, March 11, and I quote from my notification that it will deal with "safety issues related to the commencement of radioactive sludge operations at DWFP." Mr. Grumbly, are you going to start up DWFP before the safety board completes its review, and Dr. Conway, should the board complete its review before the facility begins operation?

Mr. CONWAY. Let me, if I may, talk first on DWPF.

This is a facility that has been under construction for many, many years, long before we ever came into being, or anybody currently working at DOE that I know of was in a position to be responsible for it. The contractor that is bringing it to fruition was not the original designer.

One of the things this Board has been doing since we were formed, 6½ years ago, and this has been one of our major projects, has been to look into the design of that facility, follow through as it is being constructed, and monitor and follow through on the various reviews that are being made, including operational readiness reviews.

In every operational readiness review that has been conducted, we have had personnel participating as observers. We will be holding a hearing on March 11th in the evening. We have no reason to believe, at this stage, with all the reviews we have made of this facility during construction, it cannot be operated safely.

I think they are going to have a lot of problems as they try to go through the shakedown on this facility. It is going to take them quite a while before it is going to work reliably, in my opinion. However, from a safety point of view at this time we have no questions. We have reviewed with the personnel that did the last operational readiness review, and our own personnel have been there.

Why are we holding a public hearing on March 11th? We are holding a public hearing on the 11th, in the evening so the individuals in the area can come in and listen to our technical staff review in a public forum what we as a Board and our technical staff have done over the years to assure that this plant has been built, and the procedures on how it will be operated, can be done safely.

Now, I have no reason to believe there is going to be anyone there who will have any additional information that would make us change our mind, but I want the local residents to know we have been following this carefully, and how carefully we have reviewed this matter, so they have that much confidence, if you will, that when this plant goes into operation. There has been $2.4 billion invested in this facility.

There is always a possibility, obviously, that someone, some worker may sound off, whistleblower, what-have-you. We will give them an opportunity, should there be one, but at this point I have no reason to believe that that plant cannot be operated safely.

Senator EXON. Thank you, Mr. Conway. I assume you have no further comment.

Mr. GRUMBLY. No, Senator.

Senator EXON. My time is up. My one last quick question, if I might get it in, Mr. Chairman—this will be directed to you, I believe, properly, Mr. Conway.

A press release from DOE's Savannah River operations office indicates that a recent review suggested the earthquake resistance of

F and H canyons at Savannah River may have been overstated. Is this a matter of concern to the board? Does the board intend to review these results and/or conduct its own investigation of the issue?

Mr. CONWAY. Yes. This is something we have been following for a while. These facilities were built back in the fifties. Standards have increased and requirements have increased since then for seismic surety. The analyses are still underway, so it has not been completed. In the meantime, however, the material that is sitting waiting to be reprocessed has deteriorated and continues to deteriorate.

We are balancing one potential risk against the other, and a guesstimate has been made that instead of a potential seismic event that could strain this particular canyon occurring once every 2,000 years, it may occur once every 1,000 years. That is on one side.

On the other side, we have material that is deteriorating in the canyons, constituting a hazard, so we want to see that materials continue to be processed. In the meantime, when the complete seismic analysis is available, we will study it very carefully.

Then the question comes up, how much work may be needed to improve its seismic structural strength. Number 2, how much material you put through at a given time. You can process in smaller batches, so in the event of an incident, a seismic event, if you will, that you do not have a great deal of material in process.

But in the meantime there is quite a bit of material in there, and it needs to be processed, and so we believe that DOE should continue processing that material that is in there now. We will await the results of the final seismic analysis, but yes, it is a concern to us, and it is something that we will be looking at very carefully.

Senator EXON. Mr. Conway, thank you very much. That is reassuring, and thank you, both of you, for being here today.

Thank you, Mr. Chairman.

Senator KEMPTHORNE. Thank you, Senator Exon.

Senator Bingaman.

Senator BINGAMAN. Thank you very much, Mr. Chairman.

Secretary Grumbly, let me ask you about the issue of whether or not, in your view, we are wasting money cleaning up some of these sites to impossible or unreasonable standards.

Mr. GRUMBLY. Well, Senator, I think we need reform in the Superfund laws so that we can, in fact, clean up the sites to appropriate standards.

The administration has recommended changes in the law, which have been stalled over the last year and a half, and I believe that if the Congress could enact the changes that the administration has proposed that we could both move forward, continue to protect the public, and ensure that the benefits of costs are commensurate.

I do think there are some places where almost everybody would acknowledge we are pressing the outward bounds on things, but I think our fundamental job is to protect the health and the environment, and we need to have the statutory base that is necessary to do it.

Senator BINGAMAN. OK. In the testimony that Mr. Card is presenting to the committee today from Kaiser Hill on Rocky Flats, he has a series of recommendations on page 11 of that testimony. I would just like to get your reaction to a few of those.

He complains about the overlapping jurisdiction of the EPA under Superfund and the State under its hazardous waste laws, the State of Colorado, and says that we should reform the Superfund law to allow for a single regulator at Federal facilities, for example, by clarifying that EPA may delegate Superfund authority to an appropriate State agency so that DOE would only have to work with the State as its environmental regulator. Do you have a position on that?

Mr. GRUMBLY. Again, as part of our Superfund reform package we do recommend moving to a single regulator concept at our sites, and administratively, in fact, the EPA and the States are operating very effectively in that regard right now.

I might add that at Rocky Flats it is both a more complicated but really happy picture at this point in that, by statute, the defense board has responsibility, the State has responsibility, the U.S. EPA has responsibility. As part of the new Rocky Flats compliance agreement that we are going to sign next week, the two regulatory and one oversight agencies have gotten together and totally hashed out exactly where each agency's jurisdiction is. I think it is a real testament to the board, and in particular to Dr. DiNunno, who did this, that we are making progress even in the absence of change in the law yet.

Mr. CONWAY. If I might add, in my statement, attached to Dr. DiNunno's comments on the Ahearne committee is a chart which shows what we have worked out with the State of Colorado DOE, and EPA. It is a very good memorandum of understanding, and I hope it becomes a model for other sites around the country. It is a very good way to work.

Senator BINGAMAN. Is there something we should do, or a change in the law to encourage or require that that kind of arrangement be entered into each place where there is a cleanup to be accomplished?

Mr. GRUMBLY. I believe our administration position at this point is that we should permit, particularly with respect to environmental remediation, we should permit delegation of authority to the States by the EPA when they believe that is necessary. So again, this issue is wrapped up with the larger legislation that we have, because right now the regulatory agencies can simply deed over authority without damaging themselves, but we think we definitely need to simplify this with respect to at least the defense nuclear facilities.

Senator BINGAMAN. Let me ask a totally unrelated question, and this may not be in your jurisdiction at this point, but to what extent is the Department of Energy involved in joint projects with the Russians to assist with cleanup activities there, or to cooperate in any respect on this type of activity?

Mr. GRUMBLY. You are right, it is not totally within my ambit at the moment, but I know that, for example, this spring we are going to be meeting in Moscow with the Russians as well as with other folks to review the whole issue of reactor safety, so to the extent that the whole issue of safety of reactors in the former Soviet Union is a concern we are working together with them.

With respect to the environmental management budget, the only place where we are actually sharing at this point is some technology work. It turns out that the Russians have a fair amount of knowledge in the high level radioactive waste area that we would like to get to take advantage of, and we have some sharing in that respect that is really pretty minor, still.

Senator BINGAMAN. Thank you, Mr. Chairman.

Senator KEMPTHORNE. Senator Bingaman, thank you.

Senator Glenn.

Senator GLENN. Thank you very much, Mr. Chairman.

Mr. Grumbly, I am sure you are aware the Cincinnati Inquirer has made a number of allegations out there after some investigative reporting, and these are very serious allegations. They run from safety problems to outright fraud and alleged criminal negligence. We have asked GAO to do a study of these things, but I am sure you have been looking at these things also. Can you comment on these, confirm or deny, and provide us with an interim status report of your investigations?

Mr. GRUMBLY. Yes, Senator. As you indicate, if true, some of the allegations would be very serious. In particular, there was an allegation that our contractor there had intentionally changed the baselines to appear as though we were making more progress than not. If that were to prove to be the case, that would be very serious. We have no indication at this time, however, that they have engaged in that.

We do support and encourage the General Accounting Office investigation, and our own Inspector General is involved in it at the moment as well.

If it is happening, it is one of those things that I think only some in-depth accounting expertise is really going to demonstrate.

With respect to a lot of the other allegations, one with respect to safety, for example, the chairman of the Fernald Citizens Task Force, Dr. John Applegate, has stated, and I believe that he is right, that far from safety being a systemic problem at Fernald, we are, to use his words, obsessed with safety at Fernald.

Rightfully so. I am not saying we should not be, but we have encouraged the additional reporting of safety problems not only at Fernald but across the entire system because we want employees to speak up when they see problems. So I will not say I am not concerned, but I understand where we are going there.

Obviously, my responsibility at the moment is to make sure the Department of Energy is doing its job with respect to this issue. What I did in light of the first allegations is, I assembled a team—in addition to the Inspector General—that is going to look into the specific allegations. I assembled a team of our best managers from across the complex and sent them into Fernald as a kind of visiting committee to sit down with entire team, the entire Federal team that runs Fernald, and see whether we have shortcomings in either the personnel, or the way we are doing oversight at Fernald.

You can always make improvements, but the quick look that I got back last week indicates that I think we are actually in pretty good shape with respect to the management of this site at the moment.

As you know, in fiscal year 1996 we made a decision based upon what has happened at that site in the past, where we think we can actually accelerate the cleanup of the Fernald site, not in any inappropriate way, but to try to really add dollars to the site so that we can get this place essentially cleaned up in a decade.

Unless we see from the IG, the General Accounting Office, and our own managers a lot more evidence of the kind of allegations that were done, it is our intention to continue to move forward on an accelerated basis.

But I want to end by saying that, while I do not have any reason to believe at the moment that our contractor there has been in any systematic way ripping off the taxpayers, which I think is what the Cincinnati Inquirer said—

Senator GLENN. Do you have any timetable for when you hope to have your investigation completed?

Mr. GRUMBLY. I think the GAO hopes to have its investigation completed by the end of May at the outside.

Senator GLENN. How about your independent one, your in- house investigation?

Mr. GRUMBLY. Our in-house investigation I believe we should have by the end of this month.

Senator GLENN. John, did you look into this?

Mr. CONWAY. I was going to say these allegations were made by a reporter by the name of Michael Gallagher, and I have seen the allegations he has made. I have discussed it with DOE, and it seemed to me what they were doing was a good job of trying to run these down, and rather than having the GAO Inspector General, Grumbly's people and my people tripping over each other out there, the Board felt at this stage we would wait on that, particularly the allegations on safety.

It is not so much in the nuclear area as in the remediation, as we see it at this point, so obviously we are going to keep abreast with the DOE on it, but I did not want to send technical staff there tripping over Grumbly's people, the GAO people and what-not, but we will continue to watch it carefully.

Senator GLENN. I hope you will both keep this as a priority, because this sort of came out of the blue to me. I thought everything was going along pretty well.

Mr. CONWAY. I think a good working relationship with the community has evolved in the last several years that might break down, and I would hate to see that happen.

Senator GLENN. These are very, very serious charges.

Your board authorization runs out at the end of this year, I believe, and in the past you have suggested ways in which your authority might be expanded to better address safety issues at DOE.

Could you discuss for us just a moment the current authority you are delegated, the extent that you are using all the authority granted to you, and do you think the authority should be expanded and your group continued? I think there is not any doubt about that, not in my mind, anyway.

Mr. CONWAY. At the end of 5 years, which was last year, the law required our Board to make a study and make a report to the Congress whether or not we should continue in being or have our authority be extended.

We made that report. We looked at all the pros and cons as to whether we should become a regulatory agency, as such. At that time, we decided we had enough authority to meet the objectives of the law.

It is not a sunset provision. In other words, our Board continues in being unless the Congress in its wisdom decides we are no longer needed, and the law then is changed to do away with our Board. So it is not a sunset that we have X number of years. For example, in 5 years we would go out of being.

In our report to the Congress we thought, yes, we were being successful, and we were accomplishing the objectives the Congress set for us, and that we did not need any additional authority. However, we did say we could better use some of the authority we had, and we were going to explore that. We have now for a year been doing that.

There is one area we may, but we are not at this point ready to say so, need a little additional authority. I mentioned earlier the law requires us to review and evaluate the safety standards, and we have been trying to do that, and we believe in some cases we have not been successful after a great deal of effort of our technical staff working with DOE, that they are listening to some of our suggestions and moving ahead in some cases with orders we do not believe to be adequate.

We will continue to work with them. Now, if it gets to the point that we think it is serious, and DOE is not submitting, or is putting out safety orders or are changing orders—that is a concern we have, where they are changing orders, being less restrictive than we think is needed—then it may be necessary for us to seek greater authority whereby DOE cannot modify or change safety orders or standards without it being reviewed and approved by the Board.

As of now, we do not have approval authority, but we are trying to use our action forcing, if you will, suggestions with them.

Senator GLENN. OK, good. I have several other questions here, Mr. Chairman. I would ask that we be able to submit the questions to our witnesses—

Senator KEMPTHORNE. Yes. All Senators will be invited to do so.

Senator GLENN.—for early reply on some of the effects of privatization, of cleanup, how we are going to do that and who is going to be responsible for what under that.

We have the implementation of your recommendations and some things like that that I want to get into in the Hanford program, Mr. Grumbly, as to what is going on. GAO has made some comments on the lack of speed with characterization of some of the things out there that I think you are aware of. I have several questions on this, and would appreciate your early reply.

Just let me say, I think what started out maybe back years ago in a little contentious way here, I think your relationship and the working relationship has worked out very, very well. At least that has been my impression.

Mr. CONWAY. We look upon it as we work for the same Government, and we are trying to work for the same taxpayer.

Senator GLENN. There was a question when we set up your group as to whether it was necessary, and there was a little bit of pull and tug and haul back at that time, but you are to be complimented for working these things out, doing a good job, and I just want to help out, and if there is anything needed in the way of legislation to better define your responsibilities or authorities, why, let us know at the earliest so we can get that through.

We are down to not too many days in this legislative year left now. We are down to maybe 60 days of legislative time left in this year. People do not realize that, with all the breaks we have and conventions this summer, and go out in early October, so the sooner you can get that to us the better.

Mr. CONWAY. Senator Glenn, I remember the early days when you were very active in drafting the legislation to set up our Board, and I also remember the day you came to our swearing in where somebody tried to mug you, and you took care of him also.

Senator GLENN. I remember that. I got clobbered that day.

Senator BRYAN. It sounds like there is a story there.

Senator GLENN. I do not mean clobbered getting drunk. Do not get me wrong. [Laughter.]

There was a guy just came up and slugged me, and it was a real good slugging.

Mr. CONWAY. Notwithstanding that, you came to the swearing in.

Senator KEMPTHORNE. One of the last people I would want to tangle with is John Glenn. He is in great shape.

Mr. CONWAY. The fellow did not know he was an ex-marine.

Senator KEMPTHORNE. Senator Glenn, thank you very much.

Senator Bryan.

Senator BRYAN. Thank you very much, Mr. Chairman. Perhaps the word clobbered might be a point of departure. I might go on, I just want to make sure that Nevada does not get clobbered.

Let me say, I think your report, Mr. Grumbly, is impressive, and I commend you on your progress. I do reflect upon the fact that the more progress that you make in the cleanup, which I acknowledge to be necessary, has a reverse impact on us in Nevada. That is, the thousands and thousands of shipments, whether it is 6,000 or 25,000 or 100,000 shipments, all seem to be coming our way.

I recognize the nuclear weapons complex in the generic sense is a national security concern, and Nevada, of course, has played a role for the testing of many of those weapons from 1951, initially atmospheric testing, more recently underground, so I acknowledge that.

I guess my first question is, I was surprised, I did not see any reference to any cleanup activities at the Nevada test site. My question is, are there, and if so, perhaps you may want to supplement the record, Mr. Grumbly. You may not know right off the top of your head. But that would be my first question.

Mr. GRUMBLY. Well, Senator, first of all I think you raise a very legitimate set of points, both in your opening statement as well as here, and one of the things that we saw when we did our first baseline analysis was how much the cost of this entire program is ultimately driven by the cost of dealing with the waste that gets dug up and then has to be disposed of.

The issue with respect to Nevada is an extremely serious one, and one that we obviously have to mitigate. There is no way that we can send the, in my view hundreds of thousands of shipments to Nevada over the next 40 years that could, under the most stringent cleanup program—and, indeed, I harken back again to what happened at Fernald just a year or so ago when we got the Ohio citizens group involved in looking at this, and they actually, the people who live around the Fernald site actually came out to Nevada and visited with some of your citizens and came back and said, look, we have to create a more equitable sense of what is happening here.

As a result of that, we were able to implement a set of cleanup decisions with respect to Fernald that still had some material coming to Nevada, but where there is at least some greater degree of acceptance that some may have to stay in Ohio.

So I think part of the solution is getting everybody working together and dealing with these problems, as opposed to seeing it as Ohio versus Nevada versus Washington versus South Carolina. I think there has got to be some equity in the situation.

With respect to funding, what I have tried to do, or what we have tried to do since the time I have been here, is to recognize that Nevada deserves an increasing share of resources with respect to the waste management program, and the budget allocations in each of the three budgets that we have put forward have shown gradually increasing budget allocations in waste management.

With regard to cleaning up the Nevada test site, I believe we do not have a Federal facilities agreement yet signed, and Nevada is an extraordinarily long-term process that frankly is impossible with current technology. So the long-term environmental restoration of the Nevada test site is something that we are going to all have to continue to noodle.

With respect to the specific things in my testimony, frankly, it was odd to me that I did not see any environmental restoration things, and I will go back and supplement that.

[The information follows:]

The Department of Energy signed a Federal facilities agreement with the State of Nevada on April 4, 1996 for cleanup of the Nevada Test Site and other DOE sites in the State. Along with the legal agreement there is a corrective action strategy for how we are and will remediate different parts of the Nevada Test Site. In particular, the strategy that has been developed for the groundwater impacted by the underground nuclear testing is innovative and DOE is completing a major part of it this year: a groundwater flow and transport model for the site. With it we want to designate areas of the Nevada Test Site where groundwater use would be restricted for the period of time that the radionuclides, particularly tritium, remain a risk to human health. However, with this risk-based approach to the groundwater problem, DOE and the State are recognizing that there is not nor may ever be the technology to remove the radionuclides in the underground shot cavities.

DOE is also making progress in cleaning up surface sites as well. Recent cleanup results and successes include disposal of unexploded ordnance from six pits and landfills at the Tonopah Test Range in Nevada. This potentially hazardous project was completed in 1995 with no major injuries and accidents. Altogether, over 20,000 pieces of potentially live ordnance were removed and rendered harmless, and over 120 tons of scrap steel and five tons of scrap aluminum were recycled. Ordnance at one of the sites dated from World War II. Most importantly, remediation of the ordnance eliminated an imminent safety hazard to.workers on the Tonopah Test Range. In addition, now that the ordnance has been removed, DOE-Nevada is working this year with the State of Nevada to complete characterization and remediation of all remaining contaminants at the six sites. This year we are conducting the first cleanup of one of the plutonium soil "safety shot" sites. "Hot spots" of surface plutonium contamination at the Double Tracks site will be excavated and the material disposed as low level waste on the Nevada Test Site. The excavated sites will then be revegetated with native plants.

Nevertheless, as you are probably aware, the Nevada Test Site is the largest site in the DOE complex. Our Baseline Environmental Management Report shows that the remediation of the surface "industrial sites" on the Nevada Test Site will be finished approximately 2035.

Senator BRYAN. I appreciate that. Let me just interject, I appreciate your concern for the equity, but again, when Nevada is mentioned in the context of nuclear, whether it is the weapons complex or commercial, the only part of the equation that is ever considered is what can we ship there, what can we send there, what can we inter there, what can we bury there, what can we get rid of elsewhere, and that is, from my perspective, unacceptable, and in terms of the shared concept of balancing out some of the burdens we all undertake as part of the national defense effort, that seems somewhat unfair.

Is there any other destination, other than the Nevada test site, that is being contemplated for those shipments that cannot be retained at the location of origin?

Mr. GRUMBLY. First, there is in the last 3 years a development of a commercial facility in Utah, the so-called Envirocare facility, that has enabled us to begin to diversify where we take wastes, and that has been a successful venture so far.

The long-term outlook for where waste is going to be placed in the United States is one that is still highly contentious, frankly, and we are still going through all the environmental processes to try to make sure that we essentially have an agreement among States that are net waste generators versus States that are net waste acceptors, where these issues of equity are worked out. We have had an active program with the National Governors Association over the last couple of years to deal with that issue, so it is going to continue to be a struggle.

We do have another place, other than Nevada, but it is true that the Nevada test site continues to be a major place, and a major expected place for waste.

Senator BRYAN. I appreciate your being willing to look at the broader concept, and the Chairman has indicated my time has expired. I thank him for his indulgence.

Senator KEMPTHORNE. Senator Bryan, thank you very much. I have a couple of questions I would like to direct to our panel. I do not know, Senator Glenn, Senator Bryan, if you are going to be able to stay with us. If you would like, I would give each of you another question while you are here.

Senator GLENN. That is all right. I will submit mine for the record.

Senator KEMPTHORNE. Senator Bryan.

Senator BRYAN. Could I just follow up on one aspect?

In terms of looking at other options, you mentioned the Utah site. I take it that would require a negotiated agreement between the site operator, the State, and—

Mr. GRUMBLY. We actually ship waste on a regular basis to Envirocare right now. We have the State permits to do so. The State of Utah understands what we are doing.

I want to be sure I am talking apples and apples here with you, and get back to you about exactly what kinds of waste we are shipping.

[The information follows:]

Regarding low level waste disposal, the Department of Energy currently operates six low level waste disposal sites at DOE installations. Of these six sites, three receive waste from offsite for disposal. Of the 23,061 cubic meters of low level waste disposed at Nevada in 1994, the majority of these wastes were from offsite. These wastes were from defense-related sites with the large majority of wastes originating from the Fernald site in Ohio. Of the 13,674 cubic meters of low level waste disposed at the Hanford Site in Washington State in 1994, approximately 50 percent of the wastes were from offsite. Predominantly, these wastes are from non-defense sites within DOE such as Argonne-West and Brookhaven Laboratories in Idaho and New York, respectively. The Savannah River Site in South Carolina is the third DOE site that receives offsite wastes. Approximately a small fraction of the 1 1,429 cubic meters of waste disposed of at the Savannah River Site in 1994 came from offsite, mostly from the Pinellas Plant and from Naval Propulsion Facilities. In addition, DOE also ships waste to Envirocare, a commercial disposal facility in Utah. In 1994, DOE disposed of 6,145 cubic meters of waste, mostly from cleanup sites, at Envirocare. In addition, a significant amount of low-level waste is disposed of on site (i.e., disposed of at same site where it is generated) at Hanford, Savannah River Site, Idaho National Engineering Laboratory, and Los Alamos National Laboratory. As you can see from this date, Nevada is not the only site receiving shipments of waste for disposal from other sites. The Department is currently reviewing low-level waste disposal practices to determine what, if any, changes are needed to prevent unacceptable releases and to respond to the Defense Nuclear Facilities Safety Board.

DEPARTMENT OF ENERGY—LOW-LEVEL WASTE OFF-SITE TRANSFERS FOR DISPOSAL IN CY 1992

[Cubic Meters]

	Nevada	Richland	Savannah River	Idaho	Oak Ridge	Los Alamos National Laboratory	Envirocare	Total
Ames								
Argonne National Laboratory East		221.94						221.94
Battelle								
Bettis Atomic		16.80						16.80
Brookhaven National Laboratory		350.60						350.60
Fermi		22.89						22.89
General Aviation	529.92							529.92
Mare Island		162.00						162.00
Portsmouth								
Paducah		16.40						16.40
Pearl Harbor Naval Shipyards		171.00						171.00
Princeton Plasma Physics Laboratory		2.08						2.08
Puget Sound Naval Shipyard		7138.00						7138.00
Rockwell, Canoga Park								
Rockwell, ESG		115.99						115.99
Rocky Flats	15.21	18.60						33.81
Stanford Linear Accelerator Center								
Lawrence Berkeley Laboratory		13.20						13.20
UC, Davis		173.84						173.84
Mound	1500.96							1500.96
Pinellas			58.84					58.84
Pantex	91.11							91.11
Oak Ridge Institute Science and Education					22.00			22.00
Naval Reactor Sites			(1)					(1)
FERMCO	21946.39							21946.39
Aberdeen	316.28							316.28
Inhallation Toxicology Research Institute	117.44							117.44
Total	24517.31	8423.34	58.84		22.00			33021.49

(1) total of 2087 cubic meters were shipped to RL and SR from unspecified NR sites.

DEPARTMENT OF ENERGY—LOW-LEVEL WASTE OFF-SITE TRANSFERS FOR DISPOSAL IN CY 1993

[Cubic Meters]

	Nevada	Richland	Savannah River	Idaho	Oak Ridge	Los Alamos National Laboratory	Envirocare	Total
Ames								
Argonne National Laboratory East		294.21						294.21
Battelle		67.75						67.75
Bettis Atomic		16.80						16.80
Brookhaven National Laboratory		404.96						404.96
Fermi		74.18						74.18
General Aviation	1508.10	161.37						1669.47
Mare Island		77.06						77.06
Portsmouth								
Paducah		20.50						20.50
Pearl Harbor Naval Shipyards		108.00						108.00
Princeton Plasma Physics Laboratory		18.63						18.63
Puget Sound Naval Shipyard		6332.12						6332.12
Rockwell, ESG		245.75						245.75
Rocky Flats		10.20						10.20
Stanford Linear Accelerator Center		13.60						13.60
Lawrence Berkeley Laboratory		87.24						87.24
UC, Davis		389.12						389.12
Inhalation Toxicology Research Institute	93.71							93.71
Lawrence Livermore National Laboratory	29.80							29.80
Pantex	367.57							367.57
Sandia National Laboratory	85.98							85.98
Oak Ridge Institute for Science Education					7.20			7.20
Navel Reactor Sites			(1)				(1)	(1)
FERMCO	15906.41							15906.41
Mound	430.46							430.46
Pantex	203.17							203.17
Aberdeen	321.80							321.80
Defense Nuclear Agency	5.66							5.66
Total	18952.66	8321.49			7.20			27281.35

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[1] total of 1943.45 cubic meters were shipped to RL, SR, and Enviroc from unspecified NR sites.

DEPARTMENT OF ENERGY—LOW-LEVEL WASTE OFF-SITE TRANSFERS FOR DISPOSAL IN CY 1994

[Cubic Meters]

	Nevada	Richland	Savannah River	Idaho	Oak Ridge	Los Alamos National Laboratory	Envirocare	Total
Ames								
Argonne National Laboratory East		681.02						681.02
Battelle		32.08					895.27	927.35
Bettis Atomic		16.79						16.79
Brookhaven National Laboratory		261.19						261.19
Fermi		75.75						75.75
General Aviation	761.75	522.74						1284.49
Mare Island		51.30						51.30
Portsmouth		87.44						87.44
Paducah								
Pearl Harbor Naval Shipyards								
Princeton Plasma Physics Laboratory		18.67						18.67
Puget Sound Naval Shipyard		7140.50						7140.50
Rockwell, Canoga Park		21.53						21.53
Rockwell, ESG								
Rocky Flats	326.59	139.86						466.45
Stanford Linear Accelerator Center								
Lawrence Berkeley Laboratory		49.24						49.24
Energy Technology Engineering Center	181.00	21.60					344.05	546.65
Mound	1947.03						[1] 1472.48	3419.51
Energy Technology Engineering Center							240.69	240.69
Pantex	166.27							166.27
Aberdeen	145.20							145.20
Rocky Flats	363.88							363.88
Sandia National Laboratories—CA	326.02							326.02
Sandia National Laboratories—NM	19.26							19.26
Rocket Dyne	180.71							180.71
Reactive Metals, Inc.	113.37							113.37
Allied Signal	11.02							11.02
Lawrence Livermore National Laboratory	417.75							417.75
Total	24802.17	10998.19					8317.24	44117.60

[1] Plus 180 boxes

DEPARTMENT OF ENERGY—LOW-LEVEL WASTE OFF-SITE TRANSFERS FOR DISPOSAL IN CY 1995

[Cubic Meters]

	Nevada	Richland	Savannah River	Idaho	Oak Ridge	Los Alamos National Laboratory	Envirocare	Total
Ames		13.22					1526.05	1539.27
Argonne National Laboratory East		835.26						835.26
Battelle		120.15					487.64	607.79
Bettis Atomic		4.20						4.20

DEPARTMENT OF ENERGY—LOW-LEVEL WASTE OFF-SITE TRANSFERS FOR DISPOSAL IN CY 1995—Continued

[Cubic Meters]

	Nevada	Richland	Savannah River	Idaho	Oak Ridge	Los Alamos National Laboratory	Envirocare	Total
Brookhaven National Laboratory	....	473.47	....	....	....	....	....	473.47
Fermi	....	14.99	....	....	....	....	....	14.99
General Aviation	663.71	108.99	....	....	....	....	....	772.70
Mare Island	....	26.40	....	....	....	....	....	26.40
Portsmouth	....	134.91	....	....	....	....	....	134.91
Paducah	....	....	....	....	....	....	....	....
Pearl Harbor Naval Shipyards	....	....	....	....	....	....	....	....
Princeton Plasma Physics Laboratory	....	16.80	....	....	....	....	....	16.80
Puget Sound Naval Shipyard	....	9047.00	....	....	....	....	....	9047.00
Rockwell, Canoga Park	....	....	....	....	....	....	....	....
Rockwell, ESG	....	41.16	....	....	....	....	....	41.16
Rocky Flats	....	55.65	....	....	....	....	....	55.65
Stanford Linear Accelerator Center	....	16.75	....	....	....	....	....	16.75
Lawrence Berkeley Laboratory	....	19.81	....	....	....	....	....	19.81
UC, Davis	....	69.43	....	....	....	....	....	69.43
Formally Utilized Sites Remedial Actions Program Sites	....	....	....	....	....	....	4590.38	4590.38
FERMCO	20447.95	....	....	....	....	....	....	20447.95
Lawrence Livermore National Laboratory	1598.00	....	....	....	....	....	....	1598.00
Pantex	466.32	....	....	....	....	....	....	466.32
Sandia National Laboratory	69.50	....	....	....	....	....	....	69.50
Formally Utilized Sites Remedial Actions Program Sites	....	....	....	....	....	....	4908.45	4908.45
Naval Reactor Sites	....	....	1001.50	475.70	....	....	....	1477.20
FERMCO	16630.86	....	....	....	....	....	....	16630.86
Mound	1047.84	....	....	....	....	....	....	1047.84
Aberdeen	65.12	....	....	....	....	....	....	65.12
Sandia—CA	37.33	....	....	....	....	....	....	37.33
Rocky Dyne	164.79	....	....	....	....	....	....	164.79
Reactive Metals, Inc.	135.43	....	....	....	....	....	....	135.43
Lawrence Livermore National Laboratory	1576.66	....	....	....	....	....	....	1576.66
Total	23061.19	9119.71	1001.50	475.70	....	....	6147.77	39805.87

DEPARTMENT OF ENERGY—MIXED LOW-LEVEL OFF-SITE WASTE TRANSFERS FOR DISPOSAL IN CY 1994

Disposal Site	Shipper (Cubic Meters)		Total
	FEMP	Formally Utilized Sites Remedial Actions Program Sites	
Envirocare	152.80	3.82	156.62
Total	152.80	3.82	156.62

DEPARTMENT OF ENERGY—MIXED LOW-LEVEL OFF-SITE WASTE TRANSFERS FOR DISPOSAL IN CY 1995

Disposal Site	Shipper (Cubic Meters)				
	FEMP	Formally Utilized Sites Remedial Actions Program Sites	Rocky Flats	Portsmouth	Total
Nevada	....	....	....	....	....
Richland	....	....	....	....	....
Savannah River	....	....	....	....	....
Idaho	....	....	....	....	....
Oak Ridge	....	....	....	....	....
Los Alamos National Laboratory	....	....	....	....	....
Envirocare	77.73	3.82	4.64	32.62	118.81
Total	77.73	3.82	4.64	32.62	118.81

Senator BRYAN. I want to be sure of that, because I do not have quite the same understanding, but it may not be like-to-like.

If we may do that and supplement the record, Mr. Chairman, to make sure we are doing that, but still ask in the broader concept that this equity that needs to be considered—if fairness has any relevancy at all it certainly ought to apply to a situation where one place is being asked to accept the stuff that nobody else in the world wants, and that is really, from the perspective of Nevada, that seems to be part of the track record, predating your time, so these comments are not directed at you.

Mr. GRUMBLY. Senator, I think you will find, I am sure you will, if you talk to the environmental officials in Nevada, that at least in this restoration waste management area we have been able to work out a pretty effective working relationship and we are devoting the kind of dollars that are necessary to deal with the problem, but I hear what you are saying.

Senator BRYAN. I thank you very much.

Thank you very much, Mr. Chairman.

Senator KEMPTHORNE. Senator Bryan, thank you. I think, too, you would find a number of States share your frustration. I think it points to the fact that, too often, the only remedy we are talking about currently is, we are going to store it somewhere. We do not have the technology to deal with it, and that is something we need to get on with, is the technology.

Mr. GRUMBLY. I wonder if I could clarify one thing, because it affects Ohio. I want to be sure Senator Glenn understands that we are knocking down buildings and taking huge amounts of waste offsite this year.

A lot of it goes to Nevada at this point, but we are not in the business of essentially keeping Fernald in a constructed state. When I said there might be some waste left on the site, there seems to be agreement that with respect to the central part of the site that some amount of low level waste might stay there for sometime, but most of the site will be completely taken down.

Senator GLENN. If I might, would this be the silos in those areas there that might be retained?

Mr. GRUMBLY. I believe all the silos are going to be taken down. There will be some waste that is left on the site that is kind of residual at this point, but all of the main structures at Fernald are coming down.

Senator GLENN. But you have gotten away from the idea this might be returned to a completely greenfield site?

Mr. GRUMBLY. My objective is still to return the Mound site, the Fernald site, possibly the Rocky Flats site, because of their relatively contained land areas as well as their proximity to large metropolitan areas, to try to return those to as close to preconstruction states as we possibly can.

It is going to be a challenge in the current budget environment, but I think we have a shot at doing it at those places.

Senator GLENN. I mentioned several questions, and I might send one to both of you on your current thinking on deep geologic storage versus surface. We have always had some disagreements at some of those hearings, as you know, and I am not at all certain that deep geologic is the way we should be going, which gets into the Nevada situation.

We went through this when we had some of this leaching of the glass bricks about 15 years ago, when that was going to be put into glass bricks and everything was going to be stored underground, and that took care of it for the next million years, and then the glass leached out after about the second year.

I have been a little leery of that situation every since then, so I might want to do some questions to you on that also.

Mr. CONWAY. I always believed monitored retrievable storage was the better way of doing it. I think there are assets available there for generations to come. There is highly enriched uranium that can be utilized, and to throw that away I think is wasteful.

Senator KEMPTHORNE. The reality is, if we could share the wealth and all 50 States had to retain some of this waste, you would probably get $12 billion.

Mr. GRUMBLY. Did you say $12 billion, or $12 million?

Senator KEMPTHORNE. No, whatever you need.

What I would like to do then, Mr. Grumbly and Mr. Conway, is just a few more questions. I certainly want to get to the next panel, which will be also excellent. If we could just try to get a 60-second response, and I will just keep moving here.

Mr. Grumbly, last year, you told Congress that there is an outyear budget gap between outyear budget projections and actual program requirements. Some people I think even refer to that as a train wreck. You said this was the case even after future program efficiencies were factored in. What is the assessment of the situation this year?

Mr. GRUMBLY. I think it is still going to be a stretch in the outyears to meet all the obligations that we have. If we could get changes in the Superfund statute it would help us a lot, but we are still going to have a solid program as proposed by the President.

Senator KEMPTHORNE. Good.

Mr. Grumbly, in February EPA issued the final criteria for the opening of Waste Isolation Pilot Plant (WIPP). As I understand it, the final criteria added new requirements to the process. Will the new requirements cost more money, and if so, are funds requested in this budget request, and also, what is the DOE doing to ensure the permanent repository—WIPP—is open to meet the milestones contained in the DOE agreement with the State of Idaho?

Mr. GRUMBLY. Let me answer the second first. We will meet the requirements that are in the agreement for submitting our plan for opening WIPP to the EPA on time. We will submit the requirements that are necessary so that EPA can fairly evaluate this on time, and I have no reason to believe at the moment that either the Secretary of Energy or the Administrator of the Environmental Protection Agency will not be able to make the decision to open WIPP in a timely fashion, in line with what is happening.

With respect to the requirements that came out of EPA, there were some that were simplified and some that were toughened. The one that potentially causes us some problems is the one that anticipates that there is going to be continued drilling for, I think for oil but it may be for other things, on a continuing basis over that site over a very long period of time.

In order to deal with that, we would probably have to spend roughly, I believe the estimate is a couple of million dollars a year in order to back fill behind the waste to ensure that the waste could not be drilled into, and that causes us some problems. I believe, although I will have to be sure, that the money for that is included in the budget. If it is, you will hear nothing. If it is not, you will hear from me.

Senator KEMPTHORNE. If not, it will be?

Mr. GRUMBLY. Yes. There is still time.

Senator KEMPTHORNE. Also, Mr. Grumbly, you said, so that it will open in a "timely" fashion. Are we still on course for what I believe—it was certainly 1998, but the June of 1998 opening of WIPP?

Mr. GRUMBLY. Well, I have learned not to give specific months about these things, but I believe we are on course at the moment for the middle to last part of 1998, and to meet the agreement, and the Idaho agreement is that we start moving stuff by, I think, April 30, 1999.

Senator KEMPTHORNE. Thank you very much for that response. Mr. Grumbly, regarding financial flexibility at the sites, and this will be something that I will also want to be exploring with the next panel, are there ways that the committee could give more budgetary flexibility to the site contractors and the field offices without upsetting the congressional role to authorize appropriate funds for specific purposes?

Mr. GRUMBLY. Yes, I believe there is. We proposed last year that we "unfence" the funds at one site, Rocky Flats. The appropriators felt that was too difficult to lift for a variety of reasons, so this year what we have done at Rocky, and what we may do in the future, is to put all of the money for Rocky Flats under one account.

We chose environmental restoration. That was, by the way, at the suggestion of the Appropriations Committee staff, so they are trying to help us with this problem. If that seems to work, then it may be possible, taking a look at the various sites, to deal with the accountability issues and the budget issues here by changing how the appropriation is structured.

But I saw Mr. Card's testimony with respect to this, and obviously we need to try to give the sites as much flexibility as we can while expecting them and our management to be accountable to you and to the rest of the Congress for how the money is spent.

Senator KEMPTHORNE. I agree with that last statement, but I would encourage innovation and creativity, because those are very talented people out there, and I think we need to find a way to accomplish this.

Mr. GRUMBLY. Again, I want to say, it is the Appropriations staff in both the Senate and the House that have come up with this idea, and I am hopeful it will work.

Senator KEMPTHORNE. OK.

Mr. Conway, can you suggest a more effective alternative to external regulation that will provide sufficient protection of human health and the environment while allowing DOE's programs to meet their goals cost-effectively?

Mr. CONWAY. Well, I think the way we have been operating with DOE currently is doing that job. It is external oversight, but not as a regulator. As the Court of Appeals here in Washington, D.C., decided in a case in our favor, the Court pointed out that we are action-forcing.

We cannot fine DOE, which would take money from one pocket and put it in another pocket, but I think we are operating now as an action-forcing agency in assuring safety is adequate. I do not think we need further regulation, as I tried to point out in my statement.

Senator KEMPTHORNE. You did it very forthrightly.

Do you and do your board members expect to play a role in the DOE decisionmaking process regarding external regulation?

Mr. CONWAY. As I say, the answer is yes. I met with Mr. Grumbly and Mr. Curtis and gave them my views before I came and testified. I told them exactly what I thought, and I met personally with Secretary Hazel O'Leary, and the views I have expressed here I have given to her personally.

Senator KEMPTHORNE. Mr. Grumbly, do you expect the board to play a role in this decision?

Mr. GRUMBLY. I expect everybody to play a role in this decision. Yes. It seems to be a decision that a lot of people are interested in.

I noted in your opening statement my role as Chairman of the group that has got to make a recommendation about how to implement this advisory committee—I emphasize advisory committee—report to the Secretary, and I accepted it because I was a regulator in one of my past lives. Now that I run one of the largest regulated organizations in the world, I decided that I would rather have the gun in my own hands rather than somebody else's, so we will just have to see how we go forward here.

What I can say is we will not go forward in a precipitous fashion. This is a very complicated issue on which Chairman Conway and his colleagues make very persuasive arguments, and I think we need to listen very carefully to the wisdom that they give us in these matters.

Senator KEMPTHORNE. The public comment phase of the environmental assessment on the electrometallurgical project at Argonne National Laboratory is almost complete, as you know. Have you heard any argument that would prevent the Department from reaching a finding of no significant impact?

Mr. GRUMBLY. I have not been involved in that recently, Senator, but I will go back and let you know. What I know is that we have allocated the money that you authorized and appropriated in the 1996 budget, and it is sitting there waiting to be utilized.

Senator KEMPTHORNE. The recent draft programmatic environmental impact statement on surplus plutonium disposition considered several means of dealing with this surplus over the next 50 years. Can you tell me why the integral fast reactor was not considered in this document?

Mr. GRUMBLY. I can tell you one reason is that, as I recall, and we have had this discussion in the past, the IFR per se, some people have proliferation concerns with it. I think that essentially the technologies that we examined in the plutonium disposition report were all the technologies that were essentially recommended by the National Academy of Sciences for review, one of which includes MOx fuel burning in a reactor.

Frankly, I am not technically astute enough at the moment to tell you exactly what kind of reactor technology is going to be used in that, but I think that is where we are at the moment.

Senator KEMPTHORNE. As you know, from discussions you and I have had, we aggressively must pursue technology to deal with this so that we can take this plutonium and I think burn it up so that somebody else does not blow it up, and this fits with your quotation from Isaiah of beating our swords into plowshares.

Mr. GRUMBLY. Well, I think that of the major alternatives that are being considered, which are MOx fuel burning, vitrification, deep bore hole injection, and others, that some combination of the MOx fuel option and the vitrification option—I do not want to prejudge this, but they are certainly likely to be implemented, so there will be some fuel-burning that goes on. I think it very much depends what kind of reactor environment that happens in.

Senator KEMPTHORNE. Also, can you tell me the Department's current estimate of the cost to implement its portion of the agreement with the State of Idaho, and also, just for the record, so it is part of the record, could you describe the impact of our failure to meet the milestones contained in the agreement?

Mr. GRUMBLY. Our current estimate over the next 5 years, and I confess I do not have estimates over the full 40-year life of the agreement at this point, is that it will require approximately $200 million above the original baseline that INEL was on. There is a lot of money in the base that was already allocated to some of the projects, but it will take an incremental $200 million over the next 5 years to make this happen, and I think there is some testimony to that effect by Mr. Denson in his testimony.

With respect to the implications of what happens if we miss the milestones, if the Navy misses its milestones, it cannot ship its fuel, and if we miss our milestones, we cannot ship our fuel. Since we want to be able to deal with this problem, we think that is a very effective mechanism that the Governor was able to negotiate in the agreement to hold our feet to the fire.

I have actually been quite amazed over some months to see that some people in Idaho do not think that this is a good deal for the

State. This is enforceable in court. This is the highest form of commitment that the United States Government can make.

I recognize that all of us do not have a great reputation, I guess, in terms of meeting our commitments, but this is really the kind of thing that we can have our feet held to the fire on. We need to ship that fuel. We need to do it in the most environmentally sound way that we possibly can, and that is why we negotiated all of these environmental agreements that are there.

But I think there are very strong sanctions if we do not meet what we say we are going to do.

Senator KEMPTHORNE. Well, I believe the agreements that the Governor has fashioned with the Department of Energy and the Navy really does issue in a brand-new chapter for the Department of Energy to fulfill its commitment, and we will be held accountable through the courts that it absolutely must be enforced or the shipments stop.

Mr. GRUMBLY. That is right.

Senator KEMPTHORNE. With regard to the budgetary requirements that are contained in that agreement, then, we do have your assurance that each of those years the full funding will be included.

Mr. GRUMBLY. For as long as I am at the Department of Energy. I cannot speak for what is going to happen in the future, but as long as I am there, this agreement will be honored by me personally, and you do not need me, you have got the court to enforce this, and I think the legal system is perfectly capable of enforcing this agreement.

Now, I believe in results, not dollars, so if somebody comes and says, well, it is going to cost a billion to meet this agreement over the next 5 years, my challenge is, look, we have to do more with less. I am not saying anybody would, but I do not want to translate this into how many more dollars somebody is going to get. This is about results. We will achieve all the results that are in that agreement.

Senator KEMPTHORNE. Good. All right.

I will hold my other questions. Both of you have been tremendous. You probably feel like this has been an oral exam and now you are going to get a take-home test, but we appreciate greatly all of your statements today, your candor, and the credibility both of you have. It really helps us on this issue.

I would invite the next panel to come forward, and we will take a 2-minute break while we make this transition. [Recess.]

Senator KEMPTHORNE. Ladies and gentlemen, we will continue this hearing. I will be asking each of you for a 5-minute opening statement, and then we will begin a good dialogue here.

Before we begin that process, though, Senator Glenn is going to have to be departing for another meeting, so I would like to just yield to Senator Glenn to ask a question or two he would like to ask before he leaves.

Senator GLENN. I appreciate this very much, Mr. Chairman. I have two groups waiting in my offices who are people who came in from out of town, so I cannot put them off, and I appreciate your forbearance in letting me ask a question here.

Mr. Ofte, you heard our questions here a little while ago on the Cincinnati Enquirer allegations. They are very serious allegations.

There have been several groups that have investigated that since those allegations came out in GAO is investigating it now, of course, but I wanted to get your view of it right now, what you think, or where you stand with your own internal investigation of this thing. I wanted to get that on the record while I was here, if we could.

STATEMENT OF DONALD OFTE, PAST PRESIDENT, FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION

Mr. OFTE. Yes, sir. I guess I personally had two extended interviews with that paper before they started their series of articles, and Jack Craig, who is the DOE Fernald area office manager, had four total interviews in that regard.

When the allegations first were laid out, we started our own people, of course, immediately trying to find, is there any substance here, what is going on, is there anything down there that matches things like jiggering computer programs so that they reflect more progress than was actually made, or spending taxpayer dollars without having the appropriate DOE authority to spend, and we could not find anything with our people.

The local DOE people likewise went in and made their look, and they could not find anything to substantiate the allegations that were made in that first series of articles.

The Ohio field office then had a DOE team come down from Miamisburg, and they took a look, and they could not find anything to substantiate the allegations.

Fluor Daniel Corporate took some very senior level people from the company and had them come in and do a scrub as well, and after they had completed their investigation, including running the codes and looking for any aberrations, there was nothing there.

Finally, as Mr. Grumbly said in the last little while, we had a very senior review team come in from DOE last week with people from headquarters and the Ohio field office, and then senior management people from the Richland operations office, the Albuquerque ops office, the Oak Ridge Office, the Savannah River office, a very, very competent panel, and they went through and likewise could not find any substantiation for the allegations that were made.

The company, of course, takes this very seriously. We have through our attorneys that we have retained for this purpose demanded a retraction of the articles from the Cincinnati Inquirer.

I might add, sir, that I was in Tucson last week for a waste management symposium, and I chaired one of the sessions out there and then gave one of the papers, and during the question-and-answer period inevitably this particular question came up.

My observation to the group at the time was there is not a DOE site or a DOE contractor anywhere that is not today vulnerable to a similar kind of attack, and I think it harkens back to a lot of attacks that have been made by the press over the years for various DOE contractors at various locations, and generally the DOE and the contractors do not fight back.

Senator GLENN. What is the schedule for the GAO report? When are they going to be complete with their investigation? Have they indicated that to you?

Mr. OFTE. I understand from what Mr. Grumbly said it sounded like May. We are hoping it can be sooner. I think the longer the cloud lingers, the worse it is.

Senator GLENN. I would hope we could expedite the GAO. I do not want to expedite it to the point where they do not get all the information they want to get, but I would hope they could do it before then, because we do not want this thing to fester out there.

Thank you very much. I appreciate having that on the record.

Mr. Chairman, thank you very much.

Senator KEMPTHORNE. Senator Glenn, thank you for your participation today. It is greatly appreciated.

By way of just setting the stage to follow on with what has already been said, if I were to paint the picture, we are dealing with a budget of $6 billion, and we need to demonstrate that we are getting results from the expenditure of the $6 billion, that we are serving Americans in dealing effectively with this nuclear waste.

Included with that, then, would be suggestions that you have as to what we can do differently that would be more effective for you, what we can do for you legislatively, what innovation ought to be implemented, what is the worst problem facing you? Any and all of this is fair game as we have just a good pragmatic, straightforward discussion so that we can figure out how to be effective at this whole issue.

So with that, let me begin with Mr. Bill Moffitt, and Mr. Moffitt is executive vice president of Westinghouse Hanford Company, and Bill, it is a delight to see you again. We miss you being in Idaho, but we know that you are doing very well in the State of Washington.

I will note, as I was coming to this meeting at 2:00 and coming down the hallway, a gentleman stopped me and asked me if I was going to the hearing, and I said, yes, I was, and he asked me if I was with Westinghouse, and I said, no, I was not, and I continued on. So I do not know if there is a Westinghouse look, but apparently I look more Westinghouse than senatorial.

STATEMENT OF WILLIAM C. MOFFITT, EXECUTIVE VICE PRESIDENT, WESTINGHOUSE HANFORD COMPANY

Mr. MOFFITT. Mr. Chairman, I appreciate the opportunity to testify before the subcommittee.

We are currently the management and operations contractor at DOE's Hanford site. The point of my testimony, as submitted, and also these remarks, is that we, DOE and Westinghouse as a team, have made great progress since moving out of our regulatory gridlock about 2 years ago.

We are cutting costs. We saved almost $300 million last year. We have identified a $20-billion long-term cut that we can make in the outyears on the cleanup of Hanford. We have reduced our staff by almost a third, our safety record has improved greatly, and we are making good cleanup progress. We have built up momentum in the cleanup, and we need to keep our planned funding level up.

There have been many changes here at Hanford. First of all, we have quite a legacy that was left from the Cold War, but Hanford was fortunate in being able to get out of the regulatory gridlock it was in in 1994, it was then that we set in place a new way of business called Project Hanford.

We have implemented our business strategy, projetizing, the work. We have implemented contract reform. We went from almost two-thirds of the remunerations of the contractor being a subjective evaluation to just flip-flop that to now over 70 percent of all of the contractors' fees are performance-based in a performance-based contract.

We have downsized by about 4,100 people, and we are in the middle of reengineering our entire operation. Reengineering the Corporation, by Michael Hammer and James Champy, has really kind of set the stage in corporate America today for reengineering. We hired Mr. Champy and his team to help us in our reengineering at Hanford, and we are making good progress there.

Now, what is the pay-back with our business strategy? We are also putting a focus on first things first, getting after our top priorities of eliminating discharges to the soil, reducing our mortgages by eliminating the hazards and hazardous material in our facilities so that the operations and maintenance costs can be greatly reduced, and we are eliminating our urgent safety risks. We intend to accomplish these by the year 2001.

Then, in parallel, our decisions about future disposal, how clean is clean, land use, and costs can be determined over this next 4- or 5-year period.

Meanwhile, our Hanford waste is now being safely managed and stored. Our business strategy results that we have had over the last couple of years in our spent nuclear fuel project, we have saved over $350 million and cut 4 years off of that project.

We have reduced $165 million in monitoring and maintenance costs through accelerating the transition of some of our defense facilities to deactivation. In the fast flux test facility, we moved ahead with getting that reactor defueled 4½ months early and saved about a half-a-million dollars.

We have stopped discharging unpermitted contaminated waste water into the soil and completed the treatment facilities about $27 million under budget, and we have accelerated the schedule of putting plutonium into a safe and stable state by about 5 years and at a reduced cost of $150 million.

I have a couple of charts I thought I would show that were attached to the testimony. First of all, when I said we have saved over $300 million this past year, if you look at the indirect and overhead costs that we have had in the past years, we have greatly reduced that and been able to return a great deal of our funds to direct field work in the cleanup. We have reduced our management staff by almost 45 percent.

We have also, as I said earlier, reduced our outyear cost for the cleanup. The life cycle costs, we have reduced those from $73 billion down to $53 billion, a $20 billion savings in the outyears. When I said we have a dramatic increase in our improvement in our safety record, we have gone from the bottom 25 percent at Hanford, in terms of safety record, to the top 25 percent in safety record. This chart shows how our lost-time days have dramatically dropped, clear down here to the bottom of the chart.

Also, we are pumping out the waste, out of our tanks, and evaporating it and condensing it. As you can see, we have made great progress over the last 2 years. But there is a significant amount of work to be done that remains in those waste tanks.

We have got the momentum up. If we continue on our current path, by 2001, we will have handled Hanford's top urgent safety risks, and our list of first things first. Spent fuel will be removed from the banks of the Columbia River. Our plutonium will be safe and stable in storage vaults, and our waste tanks will be in a safe, stable state, and our facility mortgages will be reduced.

The train is really on the right track. But we are concerned about any derailment there. Our urgent safety risks still remain and need to be funded. Any budget cuts below the planned levels will slow down our cleanup and increase the cost to the taxpayers. So any cuts beyond the President's request will delay our mortgage reduction and getting the tanks into a safe and stable state, and could put in jeopardy some of the savings that we have identified here in the outyears for the $20 billion savings.

Our employees and the community in the Tri-Cities have been through turbulent times. But our employees have not let us down. In fact, our performance has been improving, and improving dramatically. Our people are committed to continue to work safely, with excellence, and really continue to get good results.

So I would ask that you keep the train rolling by supporting and maintaining our planned level of funding for Hanford.

Thank you.

[The prepared statement of Mr. Moffitt follows:]

Prepared Statement by William Moffitt

INTRODUCTION

Mr. Chairman and Members of the Subcommittee, I appreciate this opportunity to testify before the Subcommittee on the Department of Energy's environmental restoration and waste management activities at the Hanford Site.

I would like to walk you through some of Hanford's recent history and our experience with gridlock; the implementation of Hanford's new business strategy and the cost savings and cleanup progress we're getting; and the impact reduced funding will have on the continuation and pace of Hanford's cleanup.

A lot has changed since I joined the Westinghouse team shortly alter it came to the Hanford Site 26 years ago. The Site's mission has changed dramatically. The Westinghouse role has changed too.

A look at the big picture tells why. With the decrease in Federal finding, the Department of Energy is having to compete for that finding like never before, and within the agency, the Hanford Site has more competition than ever for funding. To compete successfully, Hanford has to show cost-effective progress. It became clear that the Site needed to find another way of operating. It needed to leave the Cold War era mentality, but still deal with the legacy of 9 defunct reactors, 57 million gallons of high-level radioactive waste stored in 177 underground storage tanks, 2,100 metric tons of spent nuclear fuel, 11 metric tons of plutonium in various forms and aging reprocessing plants full of radioactive material.

HANFORD GRIDLOCK

Many would like to believe the Cold War ended 1 day and the environmental cleanup began the next. But it wasn't that easy. From 1989 to 1994, we had an era of false plant startups, revisited decisions and endless study. Facilities were in standby and couldn't run, and we couldn't walk away from them. In 1990, the Plutonium Finishing Plant ended its defense mission; in 1991, N Reactor was shut down; in 1992 the Plutonium-Uranium Extraction PUREX) facility was shut down. The relationship with the regulators and other stakeholders needed a lot of attention. We were in gridlock.

In 1994, the gridlock gave way. The Plutonium Finishing Plant was declared unneeded and the cleanup mission began. The Department of Energy modified its compliance agreement with the Washington State Department of Ecology and the Environmental Protection Agency. This agreement, known as the Tri-Party Agreement, provided an important path forward for Hanford. We were on our way—but we needed to find a new management approach.

OUR NEW BUSINESS STRATEGY

In 1994, we found that approach. Westinghouse teamed with the Department of Energy to carve out a new business strategy. Together, we've succeeded in changing Hanford from a Government site to a business—a business that we call Project Hanford.

In 1994, we implemented our business strategy in several steps. First, Westinghouse and the Department of Energy organized into projects. Through a strategic realignment of the key functions, we broke a large, cumbersome organization into small, manageable projects with clearly defined schedules, milestones and budgets. We aligned our work force to support the projects and created the "A" team—a diverse, well-qualified management team to head up the projects.

Second, Westinghouse and the Department of Energy left the cost-plus contract mode and entered into one of the Department's most aggressive (70 percent) performance-based contracts. We downsized our work force by 4,100 and exercised a company-wide belt-tightening by slashing costs such as purchases of computer equipment, reducing inventories, training and travel.

Third, we began an aggressive reengineering process. A process that calls for major rethinking of how work at all levels of the company is done. This process has already yielded dramatic cost savings to our $1 billion Hanford budget.

WHAT IS THE PAYBACK?

What is the payback from our business strategy? In terms of saving taxpayer dollars, focusing on results, mitigating urgent safety risks and achieving major cleanup safely, we have a good story to tell. Here is why:

PUTTING "FIRST THINGS FIRST"

We have taken the Stephen Covey principal "first things first." That means our top priorities focus on eliminating discharges to the Hanford soil; reducing the mortgage (maintenance and monitoring costs) on our obsolete facilities and eliminating urgent safety risks by the year 2001. Once this is accomplished, the decisions about future waste disposal methods, how clean is clean, Hanford land-use decisions and how much will this all cost can be determined in the next 4–5 years. Meanwhile, Hanford's waste is being safely managed and stored until decisions are made.

Our list of "first things first" include:

- putting plutonium into a safe stable form and into a storage vault;
- moving the spent fuel away from the Columbia River and into safe storage;
- reducing facility mortgages;
- putting the tanks into a safe and stable condition

We have already completed 3 items that we've taken off the "first things first" list. We have stopped the 50-year old practice of discharging contaminated waste water into the Hanford soil, deactivated the Uranium Trioxide plant early saving $800,000 and put the uranium powder into safe storage; and completed 2 low-level radioactive mixed waste landfills early and $1 million under budget.

PROTECTING THE COLUMBIA RIVER

In the spent fuel program, our integrated project team focused on accomplishing "first things first": protect the Columbia River by quickly getting the fuel out of the basin and into safe storage. There are 2,100 metric tons of degraded spent fuel stored in the 40-year-old, leakprone K Basins, only a stone's throw from the Columbia River. Through our projectization and new business strategy, we have accelerated the spent nuclear fuel schedule by 4 years and reduced $350 million in project management costs.

Working together, the project team formed good working relationships with members of Congress, State and Federal regulators and other stakeholders. With everyone working toward a common goal, removing the spent fuel is now on a fast track. Within 9 months of creating the project, we had an approved plan. DOE will be completing the environmental impact statement in 11 months and construction of the fuel storage building will be finished in 22 months. The spent fuel will be out of the K Basins 4 years ahead of the Tri-Party Agreement milestone, saving taxpayers $100,000 a day in operating costs.

REDUCING THE MORTGAGE

Accelerating the transition of defense facilities to deactivation is another area where our business strategy is paying off Putting Hanford's old defense facilities into a safe, stable condition slashes annual expenses and addresses "first things first": reduce the mortgage costs. By completing deactivation of our unneeded defense facilities over the next 6 years, we will reduce annual monitoring and maintenance costs from $240 million to $75 million, freeing up these funds for other Hanford cleanup projects.

Our Plutonium-Uranium Extraction Facility (PUREX) deactivation project is a national model for the defense complex. Last year we shaved 12 months from the deactivation schedule at this gigantic canyon facility, which reprocessed spent nuclear fuel over four decades. This year, another 4 months was cut from the schedule by reengineering work processes. The job will be completed in less than 2 years at which time we will have reduced the mortgage costs by slashing annual surveillance and maintenance costs from $34 million to less than $2 million. The facility's inventory of slightly contaminated nitric acid was successfully shipped to England for reuse by a private company, saving the Government at least $40 million in disposal costs.

Facility transition work is being accomplished faster and for less money. The Uranium Trioxide Plant, for example, was deactivated 4 months early and $800,000 under budget—reducing its annual costs. The Fast Flux Test Reactor defueling was completed 4½ months early and $475,000 under budget.

STOPPING THE WASTE STREAM DISCHARGES

Through creative project management techniques and hill cooperation with our regulators, we addressed another urgent risk: stop discharging untreated waste water to the Hanford soils. We met the Tri-Party Agreement milestone in June when the 200 Area Treated Effluent Disposal Facility was completed on time and nearly $2 million under budget. This facility stopped the flow of 15 contaminated waste streams. The final link was the completion of the 200 Area Effluent Treatment Facility. These projects, combined with the 300 Area Treated Effluent Disposal Facility, has ended the discharge of liquid wastes into Hanford soils and were completed $27 million under the total estimated cost.

PUTTING THE PLUTONIUM IN A SAFE AND STABLE STATE

We have completed the interim plutonium sludge stabilization campaign at the Plutonium Finishing Plant. This Tri-Party Agreement milestone was met nearly 6 months early. Again, we are addressing "first things first" by putting the plutonium into a safe and stable state. All high risk plutonium will be stabilized by May 1997 and safely stored by 2002 at a reduced cost of $150 million.

PUTTING THE UNDERGROUND WASTE TANKS IN A SAFE AND STABLE STATE

Hanford's high-level waste tanks represents the largest single environmental restoration project in the country. Much of Hanford's radioactive waste is stored in old, single-shell tanks. Many have leaked (67 of the 149 single-shell tanks) so it is imperative that we get the liquids out of these old tanks and into newer, safer, double-shell tanks as soon as possible To date, the liquid has been pumped from 114 of the 149 single-shell tanks and we are trying to accelerate pumping of the remaining 35 single-shell tanks. Another success in our tank farms operations was the transfer of nearly a half-million gallons of radioactive liquid waste through a 7-mile transfer line from one part of the tank system to another. This transfer made needed double-shell tank space available so we could continue pumping the single-shell tanks. Safe storage of the waste was also improved with our evaporator facility. The facility reduced the high-level liquid waste volume by 7 million gallons.

REDUCING THE COST OF DOING BUSINESS

Not only is our business strategy approach mitigating urgent safety risks, it is dramatically improving our productivity and cost-effectiveness. Through projectizing, reengineering and streamlining, we have documented savings of $300 million in 1995 alone including $128 million in overhead and administrative costs. For example, our procurement has moved itself into a competitive business environment by getting more done with 50–60 percent fewer people and still increasing productivity. The result is a $17 million annual savings to the taxpayer and streamlined buying practices, which makes it easier to do business with Hanford. In addition, the finance organization increased its span of management from 7 to 1 to 32 to 1.

During the last year, through a combination of projectization, reengineering and applying the best business practices, we have reduced $20 billion in lifecycle costs in Hanford's cleanup. Through further reengineering and cost-savings initiatives, Hanford will continue to reduce the cost of cleanup and perhaps accelerate the pace even further.

SAFETY IS GOOD BUSINESS

Most importantly, our business strategy focuses on working safely. As a result, our worker safety rates dramatically improved. In fact we have jumped from the bottom 25 percent to the top 25 percent in safety performance among DOE sites without sacrificing cleanup progress. The number of lost workdays last year dropped 66 percent from 1994 and dropped 75 percent compared to 1993. We have saved $700,000 on our 6-month insurance and workers' compensation bill.

THE SAFETY RISKS REMAIN

We have the momentum. If we continue on our current path forward, we anticipate that by 2001, Hanford will have safely handled its top urgent safety risks—the list of "first things first". The Columbia River will be protected by dry-storing the spent fuel in the 200 Area; the Site's plutonium will be in a safe, stable storage protected in vaults; the underground waste tanks will be put in a safe stable state awaiting final retrieval and disposal of waste, and the costly mortgages will be significantly reduced by getting out of the old defense plants.

WE ARE ON TRACK BUT THE RISK REMAINS

The train is on the track and rolling but we are at risk of being derailed. Our biggest concern is to make sure that we sustain our current level of funding to eliminate the urgent risks. However, if we undergo another 10 percent decrease in funding, our efforts to reduce the mortgage in the obsolete facilities will be delayed by several years, and our work to put the tank farms into a safe and stable state will also be delayed. We have dramatically reduced Hanford's funding needs but further budget cuts will reduce our momentum and increase the cost to the taxpayers; our successes and our accelerated pace will be slowed considerably.

Despite the progress we have made, the safety risks still remain and will remain until the list of "first things first" is completed. The end is in sight. Hanford has demonstrated tremendous progress and has found ways to decrease the lifecycle costs by $20 billion. If the train is derailed at this point, the lifecycle costs will increase.

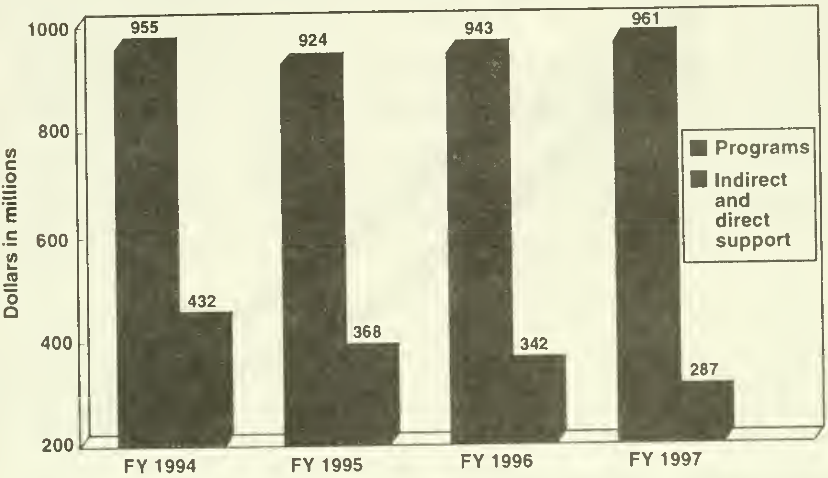
Hanford has met the test: show tangible cleanup progress to the taxpayer while at the same time reduce costs and demonstrate dollars are being spent wisely.

Our employees have been instrumental in seeing that progress is being made despite the layoffs. These are turbulent times for us. Our employees have done well not to let the uncertainty that surrounds Hanford keep them from operating with excellence, working safely and getting results.

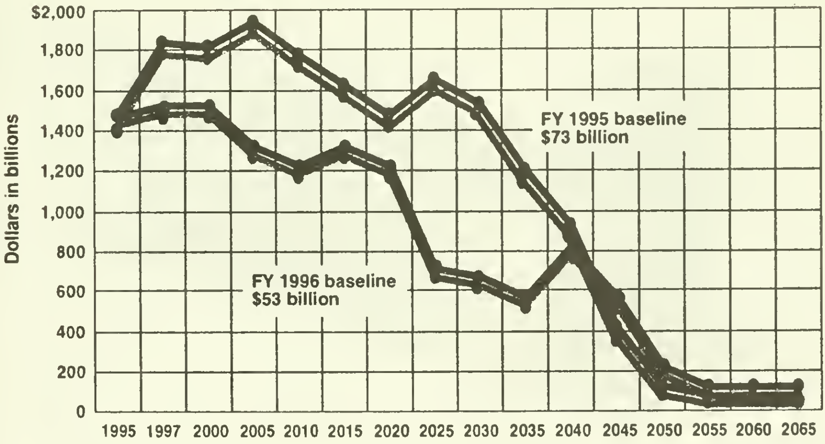
With the support of our hard-working employees, stakeholders and regulators, Hanford is well postured to continue its recent successes. We ask that you help us keep the train rolling by supporting and maintaining the current level of funding for Hanford.

Mr. Chairman, I hope when we see each other again, I will be able to report on more successful and dramatic progress at Hanford. I appreciate having the opportunity to share with you our accomplishments and explain our efforts to deliver more with existing resources. I would be pleased to answer any questions you may have at this time.

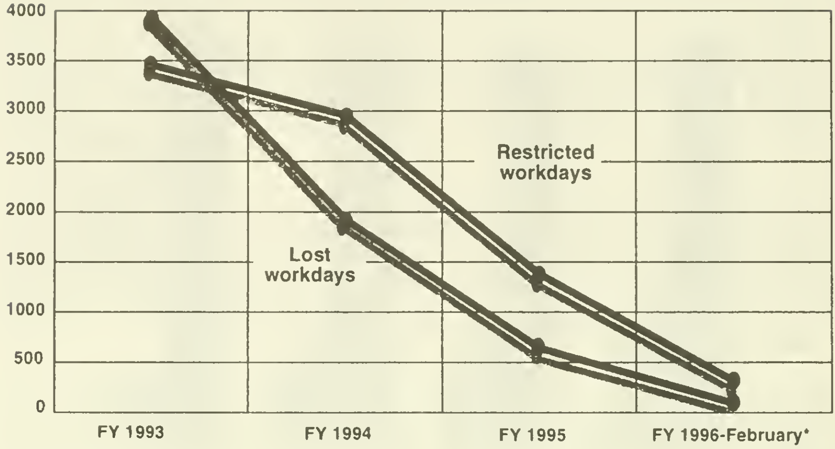
Indirect and direct support costs are being reduced and applied to programs



Saved $20B in lifecycle costs of Hanford cleanup

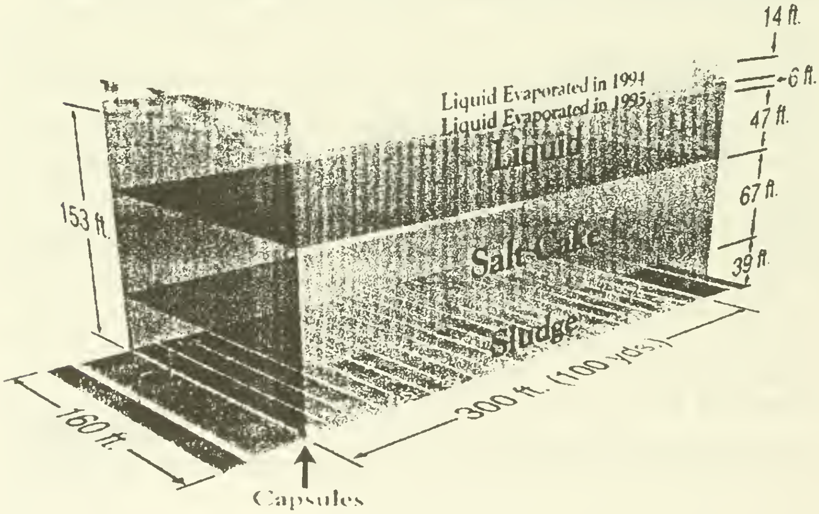


Dramatic turnaround in safety performance



*FY 1996 through February is estimated

Evaporated 7.2M gallons, 16.9M gallons remain



Senator KEMPTHORNE. Thank you very much, Mr. Moffitt.

Our next speaker will be Mr. Don Ofte, past President of Fernald Environmental Restoration Management Corporation. Also, Don, I believe, were you not an associate professor at Idaho State University?

Mr. OFTE. Yes, sir.

Senator KEMPTHORNE. Welcome. It is good to see you again.

Mr. OFTE. Like so many other things in my past, I was not able to hold on to that job either. [Laughter.]

But, sir, thank you. I am very pleased to be here. We have submitted a written comment for the record.

Senator KEMPTHORNE. Yes.

Mr. OFTE. I would like to open with a few comments on where we have been and where we are going. I started in this business in 1952, as a junior research chemist at the Institute for Atomic Research in Ames, Iowa. After a stint in the Navy, I went through the Atomic Energy Commission, the Energy Research and Development Administration and DOE, at a number of different locations, at Mound, at Albuquerque, at Pinellas in Florida, at Rocky Flats, at Headquarters, and my last DOE assignment of course was in Idaho.

I am completing now a 2-year tour at FERMCO, as the President of that institution. John Bradburne was anointed with the mantle of that presidency on February the 16th of this year. I am delighted to have had the opportunity to have served at Fernald in these last 2 years. I almost feel as though all my prior experiences were a training, if you will, to come upon that assignment. We have made a lot of progress at that location.

Production ceased at Fernald in 1989. We were one of the first of the weapon sites to enter into that category. For that and a lot of other reasons, we are at the head of the pack, if you will, in DOE, in terms of the remediation activities, in the sense of having all of our records of decision in hand. So that our regulators are now at a point where they are not saying, "Bring us more justification, prove to us that you have the right courses in action," we are there. So all of the remedial investigation and feasibility study phase is behind us. We are now engaged in real, on-the-ground remediation.

We started the fiscal year 1995 with budget guidance from the DOE that translated into a 25-year program, and about $7.2 billion. A small group of our people sat down and said, if you were funding-unconstrained, what could you do? How could you make these tasks proceed in an orderly fashion? Heel-and-toe them so that they are complementary. When they did that, what emerged was a 10-year plan. The DOE was very attracted to it. They dug into it further. The stakeholders that we have and the citizenry around the plant were equally enthusiastic. The citizens task force reviewed it. They liked it. Our Ohio EPA and our U.S. EPA regulators supported it when they were apprised of it.

Then, on June the 8th of last year, on a national TV conference call hookup, Mr. Grumbly said that he wanted to recognize the progress that had been made at Fernald, and most especially by the Citizens Task Force that had, as Mr. Grumbly pointed out here earlier, elected to recommend that an on-site disposal site be established at Fernald for the low-level, high-volume waste, and they did so.

I recall very well, at one of the citizen task force meetings, where one of the members, Lisa Crawford, said that we, in Ohio, have to share in the burden. There are stakeholders in Utah. There are stakeholders in Nevada. We are stakeholders here. The sharing of that burden and the agreement to the on-site disposal saved the taxpayers of this country $1.3 billion. I guess I have become just a total believer in the early involvement of the citizenry in arenas like the Citizens Task Force, having them work the problems, having them wrestle with the tradeoffs, and come up with reasonable, sensible conclusions.

The sum of all this is that we have total consensus now of a shared vision of a 10-year plan, including the end game: What is the site going to be when it is done? There the citizens task force made a determination that, let us not turn this place into a moonscape by trying to take it down to some ultimately pristine condition. Let us apply some judgment and common sense here. If you do not have residential application for the site or intensive agriculture, then you do not need to have the kind of Draconian cleanup that you have to have otherwise.

So they determined that the aquifer ought to be protected to a level of 10-to-the-minus-5, in terms of excess cancer obligations, the soil in the site itself should be at 10-to-the-minus-4. Then, outside the fence, it should be 10-to-the-minus-6. This was another aspect of the cost-savings that their recommendations translated back to the taxpayer. The Ohio EPA and the U.S. EPA supported that recommendation. That is the course that we are embarked on.

I would like to say a few words about safety. The Fluor Daniel ethic for safety is profound and deep and longstanding. As a consequence of the emphasis that we have brought to safety there, we just completely, on February the 15th, 4 million safe manhours for FERMCO without a lost-time accident. That happened to be the day before our Chairman, Mr. Les McCraw, came to preside over the change-of-command ceremonies from myself to John Bradburne. Mr. McCraw made a comment that stuck in mind very, very hard. The comment was this: That safety is the purest measure of management's ability to manage and leadership's ability to lead. That is something that we take very seriously.

As Mr. Grumbly noted, the head of the Citizens Task Force, John Applegate, said that his impression of watching us in operation is that we are obsessed by safety. There is a reason for that. My boss, Dick Teeter, when he came out to preside over a celebration of 2 million manhours, made the comment that if you get safety right, productivity follows, because it is just night-and-day kind of consideration. If you organize your job to do it safely, you are going to get the productivity.

Cost-effectiveness: In 1992, the estimate to clean up the site was $12.2 billion. The 25-year plan, as I mentioned, was $7.2 billion. By taking the efficiencies that you can obtain, and compressing that program to 10 years, eliminating extended hotel costs that you have if you continue on, we have taken that down to $4.8 billion.

Now, how does that happen? I guess I could give you one example of one building, where we looked for innovations. How can you do it safer, better, cheaper, faster? It was plant 7, which was the tallest building on the site. The initial plan for taking down that building was, after you stripped off all the siding and the steel was exposed, to take it down a stick at a time, with cutting torches. The estimate at that time was $33 million to take that building down in total.

The first innovation that we were going to use was to, rather than do that and have people with cutting torches for extended periods of time, cutting up steel in very high places, we would just hook some cranes to the top deck of that building, and then cut all the steel members all around, and then lift that entire story, put it on the ground, and then cut it up from there, to its ultimate disposition. That resulted in $33 million going to $14.5 million.

The next step in innovation was to contact CDI, the world's foremost experts in implosion, and ask them to come in and take the building down with an implosion. They came down to do that. Now, we did not take it down completely the first time. So on September the 10th, it went partway, and on September the 17th, it came down the rest of the way. But the net result was, instead of $33 million or $14 million, the whole project came in at about $11 million. Those are real, tangible, measurable savings to the taxpayer. It was ahead of schedule, and it was done safely.

Now, I will get back to another facet of safety that is not often mentioned, and that is subcontractor construction safety. We have 1.4 million safe manhours of subcontractor construction safety at the site, continuing for the 38 months that we have been there. When we hit 1 million of those, it was only the second time in the history of the Fluor Daniel Company that we had achieved that kind of record for subcontractor construction safety. It is one of the most difficult areas that contractors have for managing safety. That record continues today.

With regard to contract reform that my colleague, Mr. Moffitt, mentioned—we were the first DOE contractor to agree to performance-based fee contracting. Most of our fee now, as Bill was describing, are objectively measured—milestones and performance objective criteria. Well, what is the advantage of that?

The advantage is that at the beginning of every 6-month period, the DOE lines out to us in great detail, here is what we specifically want you to accomplish in the next 6 months. Then, during that time, you either make it or you do not. If you do not make it, you do not earn fee. Since we make most of our milestones, we do earn fee. But by virtue of this contract reform, you have very good alignment between what the DOE wants to be done and then our going out and doing it.

And I guess the last thing I would like to again bring to your attention is that when you have the regulators and the local citizenry and the advisory boards and the DOE and the contractor all sharing a common vision and having a basis in trust of one to another, it is amazing what you can get done. I can recall an Ohio EPA official telling a group of us one day that were that climate of trust not there, we would have to be spending a lot more of our cleanup funds for analyses and verification than we do. But they are not requiring that of us because of the knowledge that they have of our intimate day-to-day operations.

So that is, in summary, what I would like to say in support of the statement for the record, sir.

[The prepared statement of Mr. Ofte follows:]

PREPARED STATEMENT BY DON OFTE

INTRODUCTION

The Fernald project is at a critical juncture. With the project's study phase essentially complete and dozens of interim actions to address immediate environmental concerns successfully completed, the former uranium-processing site is literally at the threshold of final remediation.

The Fernald Environmental Restoration Management Corporation (FERMCO) has a viable plan in place that will reduce the risks associated with the site, reduce the schedule by 15 years and result in a cost savings to taxpayers of $2.4 billion. This accelerated 10-year remediation plan clearly was born out of opportunity.

When dramatic DOE budget cuts were announced in November 1994, the Fernald Environmental Management Project suddenly changed direction to an extended 25 year cleanup schedule with a $7.2 billion price tag. It became evident that a protracted cleanup schedule of 25 years due to budget constraints would virtually halt facility remediation for at least a decade, and the landlord utility and maintenance costs would continue to absorb much of the money earmarked for cleanup.

FERMCO, however, felt strongly that at this stage of the project—with significant program and technical uncertainty reduced, environmental studies completed and actual on-the-ground remediation beginning—the site could be remediated in 10 years instead of 25, and that total project costs could be significantly reduced. In effect, FERMCO looked at the budget crunch as an opportunity to develop a plan that not only accelerated the schedule but significantly reduced the cost.

The timing couldn't be better. All of the key remedial action requirements have been identified and virtually all regulatory approvals are in hand. The selected remedies have been well researched and are supported by all Fernald stakeholders. Proven and available technologies are being used, and appropriate waste disposal options are identified.

ACCELERATED CLEANUP ENJOYS BROAD SUPPORT

Recognizing the merits of accelerated remediation, FERMCO worked with the DOE in the Spring of 1995 to develop a conceptual approach for cleaning up Fernald in 10 years. Together, DOE and FERMCO then presented the concept to Fernald regulators and stakeholders, including Fernald Residents for Environment, Safety and Health (FRESH) and the Fernald Citizens Task Force. The task force membership represents labor, academia, local and regional Government, and area residents. The DOE, the U.S. EPA, and the Ohio EPA are included as ex-officio members. FERMCO plays an integral role in task force deliberations by facilitating dialogue and supplying information of interest to task force members.

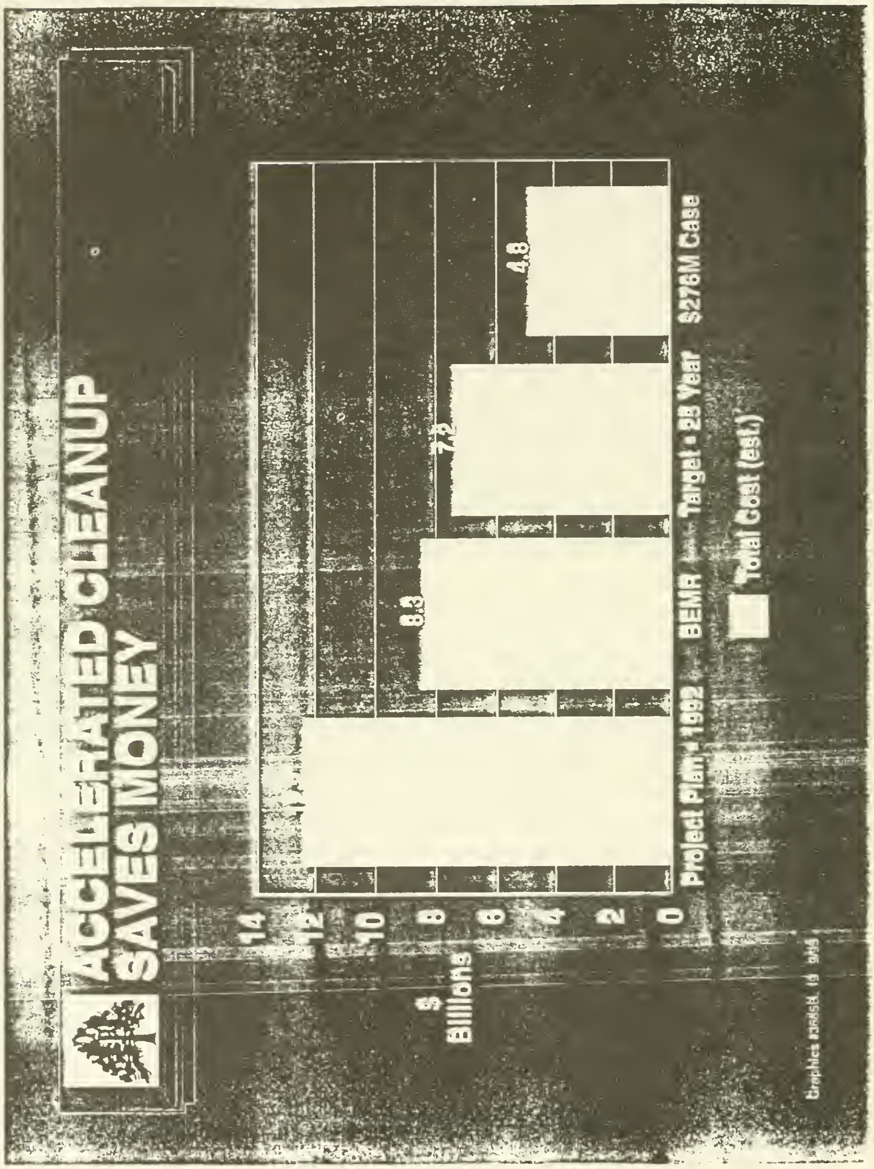
The task force considered accelerated cleanup in the context of nearly 2 years of consensus building among its members. This process led to the unprecedented success of the task force as a DOE Site-Specific Advisory Board. The task force has modeled effective citizen involvement in Government by recommending publicly accepted, cost effective solutions to critical issues facing the Fernald site.

For example, the task force recommended cleanup levels to protect the regional aquifer and provide consistent protection of human health. Restoring the site to "pristine" conditions would require surface soil excavation for five miles surrounding the site, a consequence the task force found unacceptable. The task force's sensible recommendation on cleanup levels has reduced potential cleanup costs by $1.3 billion.

Also, the task force concurred with existing DOE/EPA decisions to dispose of the most highly contaminated wastes off site, and recommended that an on-site disposal facility be constructed to accept slightly contaminated materials from the Fernald site only. This strategy has reduced potential cleanup costs by an additional $850 million.

The task force's recommendations to DOE provide the basis for significant cost savings under the accelerated 10-year remediation plan. The plan itself is reflective of the task force's final recommendations provided to DOE in July 1995. Responsible for examining tradeoffs and making hard choices among difficult options, the task force sorted through volumes and volumes of technical information and confronted numerous financial and political issues to arrive at recommendations that are fiscally responsible and protective of human health and the environment.

Having jointly endorsed the accelerated cleanup concept, the DOE, FERMCO, U.S. EPA, Ohio EPA, the Fernald Citizens Task Force, and FRESH, were able to demonstrate to DOE Headquarters and U.S. Congress the value of accelerating remediation at Fernald. By "front end loading" its investment in the Fernald cleanup, taxpayers will significantly reduce risks associated with the site and ultimately yield a $2.4 billion savings by completing cleanup in 10 years instead of 25 years as previously envisioned (see attachment 1).



ACCELERATED CLEANUP SAVES MONEY

The success of the Citizens Task Force shows the value of citizen involvement in making Government work. Fernald stakeholders, through the Citizens Task Force, provided meaningful input to the DOE, and the department responded. This led to better decisions and a high degree of community acceptance of the DOE/FERMCO path forward.

REGULATORY FRAMEWORK

It is important to understand the U.S. EPA's position regarding the time frame over which the Fernald site remediation will be implemented. The various Records of Decision (RODs) announcing the selected remedies are carefully reviewed and signed by both the DOE and U.S. CPA. The U.S. EPA, in a May 10, 1995, letter to the DOE, said the following: "In signing the various RODs, the U.S. DOE presented a time frame in which the various actions would be conducted. This remediation time frame is part of one of the nine selection criteria (implementability) (sic) which U.S. EPA uses to consider, review, and ultimately approve the remedies. These timeframes were also conveyed to the public during the comment period. U.S. EPA believes that according to the Amended Consent Agreement (ACA), the time frames specified in the RODs must be followed."

The letter further stated that "the 10-year cleanup scenario is consistent with U.S. DOE's legal obligations in the ACA," and that the associated cost savings are "not only fiscally responsible but consistent with the desires of the stakeholders who have been directly involved with the Fernald site since the 1950s. Therefore, U.S. EPA supports the 10-year cleanup scenario as one being both fiscally responsible and required under the ACA."

It is equally important to note that while FERMCO has spearheaded this major new initiative to accelerate the overall cleanup of the Fernald site, the company continues to meet all of the milestones included in the Amended Consent Agreement between DOE and U.S. EPA and comply with all regulatory, safety and other requirements.

"ON-THE-GROUND" CLEANUP NOW IN PROGRESS

Today, at the direction of DOE, FERMCO resources are focused entirely on planning and executing the accelerated 10-year remediation plan. DOE and FERMCO, in conjunction with the Federal and State regulatory agencies overseeing the Fernald project, have identified the roadblocks that stand in the critical path of the plan. At this very time FERMCO is aggressively removing those roadblocks. One example is Fernald's remaining uranium product inventory left over from the production years. While about half of the 33. million pound inventory already has been sold or transferred to other DOE sites since 1991, the remaining inventory is being stored in buildings targeted for dismantling. DOE and FERMCO are aggressively pursuing appropriate off-site relocation of that material.

FERMCO has successfully completed many significant on-the-ground remediation projects during the past year, including the uranyl nitrate hexahydrate (UNH) transfer and neutralization project in late 1995. UNH represented a public health threat and was of great concern to the Ohio EPA and the local community. FERMCO safely transferred and neutralized more than 200,000 gallons of liquid UNH—which essentially is uranium dissolved in nitric acid—that had been stored outdoors for years in deteriorated and leaking tanks and pipelines.

Also, within the last year FERMCO has completely stabilized 6,500 gallons of thorium nitrate; performed Plant 4 safe shutdown activities to remove holdup materials from equipment and lines; and transferred and' neutralized hydrofluoric acid and decontaminated the railroad tank car in which it was stored. In addition, construction of the Vitrification Pilot Plant to treat radium-bearing wastes stored in aboveground silos at Fernald is nearing completion.

Overall, FERMCO has made great strides since assuming responsibility for managing the cleanup of the Fernald Environmental Management Project in December 1992. FERMCO has treated more than 650 million gallons of contaminated water; shipped more than 2.6 million cubic feet of low-level radioactive waste off site for disposal; and demolished more than 8,500 tons of contaminated building materials.

SAFETY STANDS AS FERMCO'S HIGHEST PRIORITY

All this work has been accomplished while complying with one of the most aggressive health and safety programs in the environmental business. As a subsidiary of Fluor Daniel, Inc., FERMCO values nothing more than protecting the safety and health of its work force and neighbors. FERMCO recently surpassed four million consecutive safe work hours without a lost workday injury. FERMCO attributes this safe work record to the dedication of FERMC0 management and employees to make safety their highest priority.

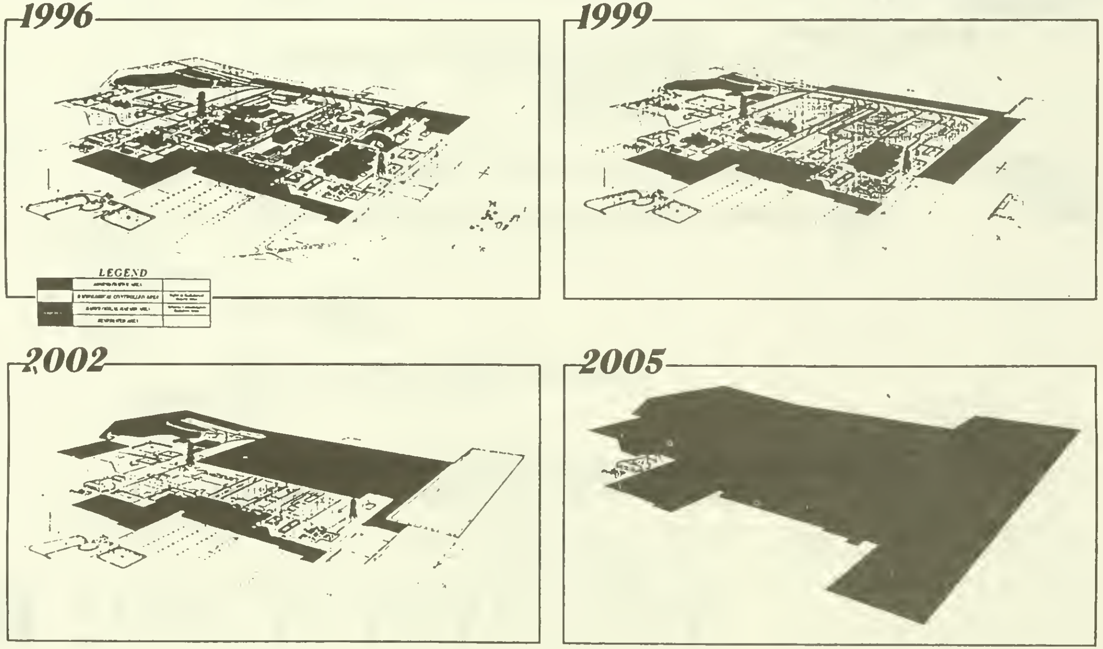
FUNDING CRITICAL TO PROJECT SUCCESS

Under the accelerated 10-year cleanup plan, realistic schedule milestones have been developed and cost estimates have been established for each of the five areas targeted for remediation at Fernald: the Waste Pits Remedial Action Project, the Facilities Decontamination and Dismantling Project, the Fernald Residues Vitrification Project, the Soil Remediation Project and the Aquifer Restoration Project (see attachments 2 and 3). The accelerated plan can be accomplished with approximately $276 million per year plus allowance for inflation.

FERNALD
Environmental Management Project

10 YEAR REMEDIATION PLAN

Fernald Environmental
FERMCO
Restoration Management Corporation



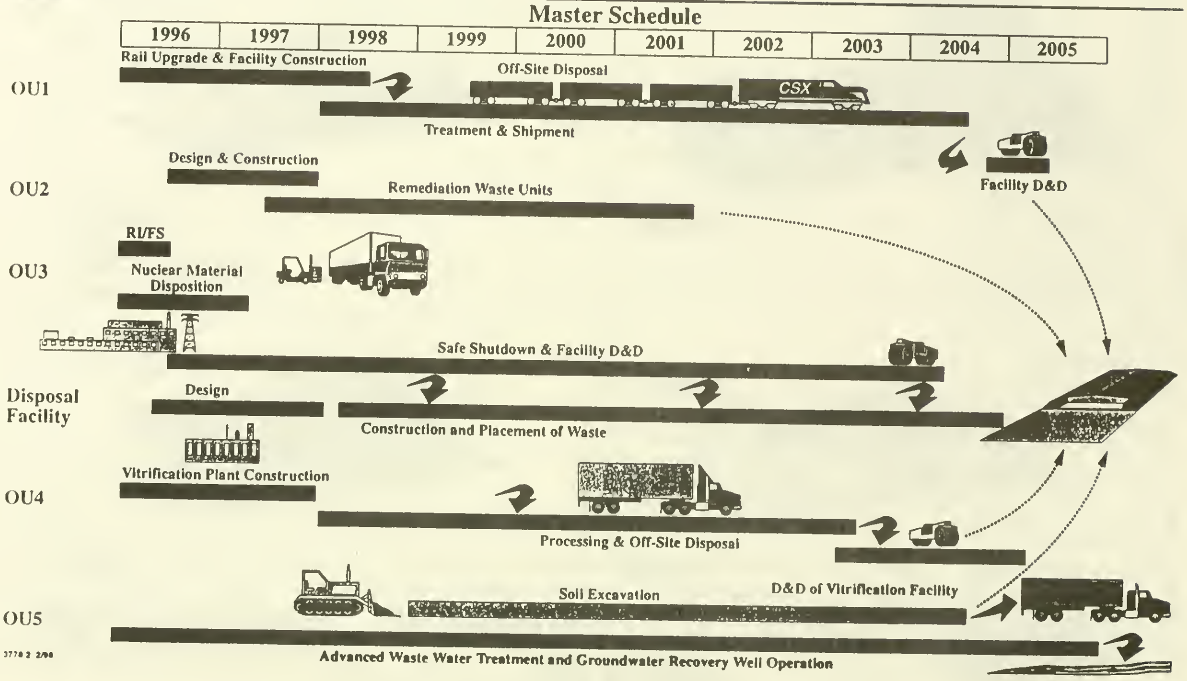
1996

1999

2002

2005

FEMP 10 YEAR PLAN



However, it must be understood that any reduction in Fernald's anticipated annual funding level would cause significant adverse impacts on the entire project. Reducing Fernald's annual funding allocation in any given year likely would result in the inability of DOE/FERMCO to complete the job according to the provisions of the accelerated 10-year plan. Reduced funding clearly would extend the project and defeat the whole purpose of the front-end loading that already has taken place—and continues to take place—in support of the safe and efficient remediation of the Fernald site in 10 years. Reduced funding also would result in an increased burden on taxpayers, which FERMCO believes is unwarranted and should be avoided.

Additionally the elimination of carryover funding would curtail our ability to make long-term commitments to subcontractors. At issue here is whether we will be able to make long-term, multi-year commitments to subcontractors while maintaining our ability to pay them on a year-to-year basis. FERMCO commits every dollar that is available to us—the company had no uncommitted money at the end of fiscal year 1995. Every dollar was committed to active, ongoing and worthwhile projects. In order for the accelerated 10-year plan to work in the most cost effective manner, we fully intend to continue this performance every year.

INVESTMENT IN ACCELERATED CLEANUP MAKES FISCAL SENSE

The bottom line is that the Fernald Environmental Management Project is further along in the CERCLA process than any other DOE site. FERMCO stands poised and ready to implement the final remedial activities at an accelerated pace. The key decisions have been made, the technologies are proven and available, public consensus on the path forward has been reached, and the job is achievable. FERMCO expects no surprises for which the company is not prepared, as we have taken into account the potential for "unforeseen variables" that could affect our ability to execute the plan in a safe and efficient manner. The only unknown FERMCO is concerned about is whether adequate funding will be provided to complete the project in 10 years.

FERMCO believes it has clearly demonstrated that "front-end loading" the investment in Fernald cleanup will yield a complete remediation in less than one-half of the time projected in current reduced-budget scenarios. In addition to saving billions of taxpayer dollars, the symbolic significance of getting remediation of a major facility off the books would be incalculable. It seems apparent that, dollar for dollar, there are very few opportunities in the DOE complex that offer a clearer choice or more attractive dividends.

Senator KEMPTHORNE. Mr. Ofte, thank you very much. I appreciate that.

The next speaker will be Mr. Lincoln Hall, Vice President, Environmental Management and Enrichment Facilities, Lockheed Martin Energy Systems, Oak Ridge. Mr. Hall, welcome

STATEMENT OF LINCOLN E. HALL, VICE PRESIDENT, ENVIRONMENTAL MANAGEMENT AND ENRICHMENT FACILITIES, LOCKHEED MARTIN ENERGY SYSTEMS, OAK RIDGE

Mr. HALL. Thank you, Senator.

If you will accept my written comments, I would like to summarize a few pertinent points.

Senator KEMPTHORNE. Yes, in fact, all of your formal statements will be made part of the record. If you can summarize and just hit the key points, that would be helpful.

Mr. HALL. Thank you.

Oak Ridge, Tennessee, resides on a very water-rich environment, with a very complex geology, that provides very rapid transport for groundwater as well as surface water. There is about 750,000 people who live within a 50-mile radius. It has got about 650 contaminated facilities on it; about 62 nuclear facilities, five of those shutdown reactors; and has 42 radiological facilities in it. The current assessment is about 6 million curies of various radionuclides that reside on that site and in those facilities.

In the last 10 years, significant progress has been made in the cleanup business there in Oak Ridge. Some 69 assessments have been completed, 22 interim actions, and 47 remedial actions, and 120 acres of land has been capped, and 38 acres of surface impoundments have been contained, 17,000 PCB capacitors have been removed and incinerated, 300 million kilograms of waste disposed, 5 groundwater plumes have been contained, and, last but not least, some 8 million kilogram of mixed waste has been incinerated in a toxic incinerator.

We still have a lot to do. The BNR plan that is on record would have projected that that cleanup be accomplished over about the next 30 years. Partnerships have been developed, however, over the last few years, with the regulators and the State, the EPA, the local stakeholders, the Oak Ridge Economic Council, and chambers of commerce, with the Oak Ridge Waste Management Association, which represents over about 110 companies. Through those partnerships, we have been working a vision for Oak Ridge that was celebrated here on the 19th of February, with some of our local congressional delegation, along with Mr. Grumbly, committed through a series of discussions and summit meetings to a vision we refer to as 2010.

Essentially, what that vision calls for is that over the next 15 years, given some brownfield standards can be established, there is a number of things that we can do to essentially de-Federalize the shutdown gaseous diffusion buildings, over 3 million square feet of such facilities that exist, both at the K–25 as well as some of the uranium processing buildings that exist at Y–12. Rather than go to the old approach of tearing it all down and turning it into a greenfield, where possible, clean it up to acceptable standards that could be used for re-industrialization.

In addition, we would like to brownfield appropriate areas and remove from the NPL about 85 percent of the land that is held by the DOE there. So, in fact, there are three things that I would like to discuss with you that I think would be very appropriate toward helping us realize that vision.

One is to help us establish some de minimus levels for free release of radionuclide materials—metals in particular—to the open economy. That is, as it is done in Europe or elsewhere. This would allow us to stimulate the recycle of various materials and reduce the mortgage for decontamination and decommissioning of facilities such as the old gaseous diffusion plants.

Second, we could use an established framework for future land use. One in particular that would indemnify the private sector, such that residual DOE legacies risk would be indemnified to the private sector.

The third thing that would help us to realize this vision, of course, is to establish multi-year contracting capabilities that would stimulate the private sector and, in particular, cover their capitalization and investment costs in order to incentivize them to invest their capital into private sector capitalization and cleanup in the area.

Those are three particular things that I believe would help us tremendously in meeting that vision.

Lockheed Martin has been, we believe, a very responsible steward there for quite some time. We are committed to continuing that stewardship. We, of course, are committed to safety. As Don has mentioned, a number of innovative things have happened there in the area of safety, such as having our people teach the safety courses and participate in performance work teams, toward aggressive standards of accomplishing work.

We have been on an aggressive cost-reduction program for many, many months. Just recently, the Vice President recognized us for having saved over $365 million since 1993, for cost-savings, when he awarded us the Golden Hammer Award.

We have had a very strong TQM policy and doctrine at work in all of the cleanup initiatives that we have responsibility for. That has led, with significant recognition by the State of Tennessee, for the work that has been accomplished, as well as significant recognition by the Secretary for having competed and succeeded in the Malcolm Baldridge criteria for the work that we did.

So I thank you for the opportunity of spending this time with you.

[The prepared statement of Mr. Hall follows:]

Prepared Statement by Lincoln Hall

Mr. Chairman and members of the Strategic Forces Subcommittee: Thank you for the opportunity to testify on the Environmental Restoration and Waste Management Activities in Oak Ridge.

Environmental management programs in Oak Ridge are moving forward under the leadership of the Department of Energy and Lockheed Martin Energy Systems to address current challenges and to open the door to a new future for Oak Ridge and the East Tennessee region. These programs are being pursued under an important and powerful partnership which has been shaped with key members from the Congress, the Department of Energy, Lockheed Martin, the State of Tennessee, and' the local community as active members. A highly successful conference recently held in Oak Ridge brought representation from these partners, including representatives of over 100 environmental companies located in Oak Ridge, together to review trends in the international environmental market and explore the future of environmental programs in Oak Ridge. This conference, in which the Honorable Thomas P. Grumbly of the Department of Energy played a leadership role, helped align the vision and resources collectively held by members of the Oak Ridge partnership. It is through such partnerships that past successes have been achieved.

The progress made by environmental management activities in Oak Ridge should be viewed in light of the 50-year legacy of Department of Energy activities and their resulting legacy of hazards and risks. Oak Ridge is in a dense urban area; has a water-rich environment with a complex geology which promotes rapid transport of contaminants in ground water and surface water; has municipal water intakes and recreational use of water resources immediately downstream; and over 750 thousand people live in a 50-mile radius of the facilities. Oak Ridge has approximately 650 contaminated facilities and release sites, including 62 nuclear facilities, 42 radiological facilities, 6 shutdown reactors, and 6 million curies of multiple radionuclides in legacy waste burial grounds, with some area waste in direct contact with groundwater. In response to such complex challenges and the resulting health and environmental risks, the Department of Energy, Oak Ridge Operations, and Lockheed Martin Energy Systems have accomplished much over the past 10 years. Sixty-nine assessments, 22 interim actions and 47 remedial actions have been completed. Over 120 acres of land have been capped. In addition, 38 acres of surface impoundments have been closed under RCRA, over 26 miles of asbestos has been removed, over 17,000 PCB capacitors have been disposed, and nearly 300 million kilograms of waste have been permanently and safely disposed. Groundwater plumes have been contained at two sites, groundwater seeps are collected and treated at three sites, and nearly six billion kilograms of liquid wastewater have been treated, including eight million kilograms of low-level radioactive and hazardous mixed waste and 3.5 million kilograms of low-level radioactive waste.

Credit for accomplishments to date is due to the leadership provided by the Department of Energy, Lockheed Martin, and our partners in Oak Ridge. Working closely with the State of Tennessee, local community groups, and our major subcontractors, we will continue to make more progress in fiscal year 1996. This year, we will complete 20 remedial actions and demolish 33 structures. We will also continue stabilization actions for the shutdown Molten Salt Reactor, a major high-risk facility on the Oak Ridge National Laboratory site, and will continue removal of highly enriched uranium deposits remaining in shut-down process buildings on the K–25 Site. Both of these activities are continuing with the guidance and support of the Defense Nuclear Facilities Safety Board.

In fiscal year 1996, we will also treat, store, or dispose of more than 200 million kilograms of waste generated from environmental restoration activities and will complete 12 additional assessments. We will safely and compliantly maintain 581 facilities and 1,252 acres of CERCLA/RCRA units contained within the 35,000 acre Oak Ridge Reservation.

Finally, we will in fiscal year 1996 apply 21 demonstrations of enhanced technology to current environmental problems where new, more cost-effective approaches are needed to effectively meet regulatory Requirements. The infusion of technology into environmental cleanup operations is critical to achieve important defense and energy research missions assigned the Department of Energy's Operations Office in Oak Ridge and its facilities in Tennessee, Kentucky, and Ohio.

As we look to the future, Lockheed Martin has proposed, in partnership with the Department of Energy, a vision in which the Department of Energy's Environmental Management mission in Oak Ridge will be essentially completed by the year 2010. Under this vision, all Oak Ridge legacy hazards will be comprehensively remediated to acceptable risk levels by the year 2010, disposition of legacy wastes will be completed, and reindustrialization and deFederalization of most of the Department of Energy lands and facilities now managed by environmental management programs with heavy surveillance and maintenance costs are expected to be completed. Many facilities currently scheduled to be decontaminated and decommissioned will be in the hands of the private sector serving new purposes. We believe that this vision successfully executed would reduce the time required to address environmental challenges in Oak Ridge from over 50 years to approximately 15 years with a commensurate reduction in funding requirements by approximately $8 billion from the most recent baseline plans submitted to Congress by the Department of Energy.

In Oak Ridge, we are well on our way with this course of action. I would like to identify a few key activities in which we and our partners must succeed if the benefits associated with achieving our vision for 2010 are to be obtained. These include:

- *Continued contract reform.* We intend to essentially place the environmental management projects under performance-based incentivized contracts in order to further reduce costs, facilitate teaming with the private sector, and provide for risk sharing between the Department of Energy and Lockheed Martin.
- *Exploitation of technology.* Our goal is to leverage technology development through partnerships with the private sector, the Oak Ridge National Laboratory, and other national laboratories and research institutions to more efficiently and effectively address our environmental challenges.
- *New approaches to decontamination and decommissioning.* To support the gaseous diffusion plants decontamination and decommissioning mission, we will remove and recycle equipment, metals, and other materials to reduce program funding requirements. We will help our private sector partners establish and use radioactive metal processing capabilities to support this approach. An on-site disposal cell or interim storage capacity for waste generated by demolition and metal recycle activities will be established by the year 2000.
- *Reindustrialization of sites.* New tenants from private industry are expected to be attracted to the K–25 and Y–12 sites as environmental management and defense program missions continue to change. Reindustrialization efforts will be compatible with long-term community visions.
- *Acceptance of institutional control strategies.* Cleanup targets and institutional control strategies which are consistent with land use plans in the community vision for 2010 will be established through joint planning with our partners, and will be accepted by regulators and stakeholders.

Our progress toward accomplishment of the 2010 vision will be measured by the following milestones:

- By the year 2000, over 85 percent of the 35,000 acre Oak Ridge Reservation will be removed from the Environmental Protection Agency's National Priorities List.
- By 1999, pump-and-treat plume containment at Portsmouth, Ohio, will be converted to a passive, minimal-cost operation.
- The Oak Ridge National Laboratory gunite tanks, with waste similar to the Hanford tanks, will be remediated by 2002.
- All groundwater contamination sources will be controlled by 2005.

The Oak Ridge partnership has achieved substantial progress in meeting its environmental challenges even under the national budget constraints and declining local funding observed since 1994. A significant part of the credit for this performance must be given to Tom Grumbly and the Department of Energy (DOE) for their leadership in instilling a quality culture which has helped to leverage DOE's budget in environmental management programs. Lockheed Martin has been an enthusiastic partner in this effort to achieve more with less. To reduce costs and increase productivity, we have moved away from subjective award fee contracts and toward objective incentive fee contracts. This has resulted in more commercial-like practices and produced greater competition in subcontracting; layers of health, safety, and environmental oversight have been restructured while maintaining or improving project safety performance; and the use of a systems approach to define project requirements, with configuration management employed through project life, has become standard practice in our programs. In addition, our use of specialty niche subcontractors and our outsourcing efforts have steadily increased over recent years. The use of highly competitive niche contractors with special expertise has helped leverage DOE funds in Oak Ridge. The use of niche subcontractors and outsourcing has also helped grow oak Ridge companies which compete in the national marketplace, and thus helped stabilize the local economy through the creation of new jobs. Currently, Lockheed Martin has committed its systems engineering capabilities and experience toward helping to resolve tough technical problems throughout the DOE complex and achieving cost savings for the DOE by integrating environmental management activities and the best available environmental technologies from across its operations in Oak Ridge, Idaho, and Sandia. Results should begin to be evident in 1996.

As we move forward, we will need help from Congress to address three critical issues. The first is the need to establish a deminimus level for free release in this country for trace contaminated materials. This is essential if recycle of equipment, metals, and other materials is to be a viable strategy for the Department of Energy. The second is to establish a framework for future land use that indemnifies private users from any residual legacy risks on Department of Energy properties. This is, of course, essential to reindustrialization strategies. The third issue involves establishing a multi-year contracting capability that will stimulate private sector investment in environmental programs. This is needed to support privatization strategies which may involve, for instance, the investment of private sector capital which can only be justified by the potential existence of long-term operating contracts.

Lockheed Martin Energy Systems is committed to being a leader in responsible environmental management stewardship. In Oak Ridge, our Columbus Initiative Cost Savings Program, recognized by Vice President Gore's Hammer Award in 1995, realized $392 million in savings from fiscal year 1993 to fiscal year 1995. The Energy Systems Environmental Management Program won both the Tennessee Quality Achievement Award and the Department of Energy Quality Accomplishment Award in 1995. We have a strong commitment to sustain this kind of stewardship in the future as we continue to pursue lower-cost environmental management programs in Oak Ridge. By continuing this commitment to stewardship and by sustaining our strong partnerships in Oak Ridge, we are confident that we can help the Department of Energy achieve mission success.

Senator KEMPTHORNE. Mr. Hall, thank you. We appreciate your input.

Our next speaker, Mr. Ambrose Schwallie, President, Westinghouse Savannah River.

STATEMENT OF AMBROSE SCHWALLIE, PRESIDENT, WESTINGHOUSE SAVANNAH RIVER COMPANY

Mr. SCHWALLIE. Thank you, Mr. Chairman. We are glad to be here. We submitted a written testimony, but listening to your opening remarks and trying to be a little more responsive to your challenge of showing objective, concrete, tangible cleanup, I could submit this document and a videotape version that shows the progress specifically made in the DND area at Savannah River this past year. It is very graphic and very easy to look at.

Senator KEMPTHORNE. Good. I would like to make that part of the record.

Mr. SCHWALLIE. OK, thank you.

At Savannah River, Westinghouse has worked very closely with our customer and our regulators to maintain to two dual missions: stockpile support and environmental restoration and cleanup, while the Nation wrestles with what to do with Savannah River in the long term.

And despite some great personal apprehension and a very unstable work environment, our employees have responded admirably, doing more with less, meeting new, more demanding safety requirements, and, up until now, maintaining all of the sites' critical mission capabilities. Even with the loss of more than 8,000 jobs since 1992, they are operating more nuclear facilities today than at any other time since the reduction of East-West tensions.

As examples, our tritium operators continue their unblemished record of 100 percent on-time delivery, without a single reliability problem in the field. Last year, the Defense Board called the start-up of our new tritium facility a role model for the DOE complex. In addition, we have started up a number of other key nuclear facilities. No one in the complex has a better record than Savannah River.

Just last month, we began to stabilize some 80,000 gallons of highly radioactive solutions in our F canyon. That was mentioned earlier today. That restart was called by DOE the best that they have observed.

Our Saltstone low-level waste treatment facility has operated flawlessly since it started in 1990. We have safely processed almost one-half-million gallons of radioactive sludge that will be the initial feed for our Defense Waste Processing Facility, which is now within days of starting to stabilize in glass 34 million gallons of high-level waste stored since the early fifties.

Throughout these and other operations, we have maintained an industrial safety record that is three times better than the rest of the DOE complex, and nine times better than industry in general. All of this has been accomplished while coping with dwindling budgets, by working with DOE to reduce our overhead costs more than 30 percent, and return over one-half-billion dollars to the taxpayer in real, traceable hard-dollar savings generated by employee-driven initiatives to re-engineer the way we do business.

However, today, we lie at a critical juncture. Further budget reductions cannot be made without critical mission capabilities going away. While we continue to work with DOE to pursue greater efficiencies, we are limited in what additional things we can accomplish.

At DWPF, as an example, proposed budget trends, if continued in the future, will have dramatic impact. Consistently reducing spending rates not only increases life cycle costs over the entire waste stabilization campaign by almost $12 billion, they also string out finally emptying waste tanks that are now already beyond their 30-year lifetime.

Similar funding scenarios draw out other major environmental programs and threaten our compliance with State and Federal agreements. However, I think the most significant effect of additional budget cuts and budget trends is our ability to maintain the capability to meet the missions you will probably ask us to take on in the future.

Right now, Savannah River is involved in more than 10 separate processes under the NEPA Act. Each one identifies as a candidate for critical missions that still need to be done. Those missions range from storage and disposition of weapons-usable plutonium to the disposition of highly enriched uranium inventories.

In the years since the end of the Cold War, we have juggled resources to preserve the core competencies and the capabilities we need to keep these options open for our country. Further cuts beyond budget levels planned will force us to foreclose on our ability to deal with some of these. This not only concerns some of the operational issues I have just outlined, but also the exodus of critical skills from the site, which, over the past 3 years, have been extensive. They are skills unique to the site and the technologies employed at the site. They are almost irreplaceable.

So, in closing, I would like to leave the committee with just a few final thoughts. In your deliberations, please focus on issues that are complex-wide in nature, and not simply site-by-site considerations. I urge you to take into account those things we need to do to maintain your future mission options, not just current operational needs. Cut us further, and the critical mission capability becomes jeopardized in a significant way, and so do the people.

But in spite of this, we will continue to do whatever we can with the resources you provide us to meet the missions you assign us as efficiently as possible. Our people our strained, but still very responsive. So anything you can do to provide them stability can only help that responsiveness and our ability to maintain the capabilities needed to complete the operational and cleanup tasks you assign to us.

Thank you.

[The prepared statement of Mr. Schwallie follows:]

PREPARED STATEMENT BY AMBROSE SCHWALLIE

Thank you Mr. Chairman. My name is Ambrose Schwallie. I'm President of Westinghouse Savannah River Company. We manage and operate the Savannah River Site under a contract with the Department of Energy

I appreciate the opportunity the subcommittee has provided me to offer a contractor's perspective on the difficult funding choices involved in operating and cleaning-up our nation's nuclear weapons facilities.

At the Savannah River Site, Westinghouse has worked closely with DOE and our regulators to maintain our dual missions of stockpile support and environmental clean-up, while the nation wrestles with redefining our role in the post-Cold-War era.

Despite great personal apprehension and a very unstable work environment, our employees have responded admirably: doing more with less; meeting new, more demanding safety requirements; and—up until now—maintaining all of the site's critical mission capabilities.

A MAJOR OPERATING SITE—NOT JUST CLEANUP

Even with the loss of more than 8,000 jobs since 1992, they're operating more nuclear facilities today than at any other time since the reduction of East-West tensions. This is particularly notable, because—unlike a site that's strictly involved in clean-up-we have to maintain the infrastructure and support to meet the stringent safety, security and operational requirements that are needed and expected of contemporary operating nuclear facilities.

As the only remaining site in DOE with major nuclear facilities still operating, the budget and staffing cuts of recent years have truly challenged us to re-engineer—in close cooperation with DOE—the vital functions we have in place to support our operating facilities.

For example, because of extensive requirements to document our safety bases and performance standards, many of our training programs must stand up to tough analysis and review by the organizations that oversee us. One way to help do that, is to get your training accredited. Today, SRS is the only site in the complex with training accredited by the DOE Office of Nuclear Safety. Just as significant, however, is that at the same time we met those accreditation milestones, we re-engineered our entire training infrastructure—freeing up 92 people and saving $15 million in training costs, or 22 percent of the site wide training budget.

In all—working closely with our DOE customer over the past 3 years—we've reduced our overhead costs by more than 30 percent. In addition, we've returned about ½ billion dollars to the taxpayer in real, traceable, hard-dollar savings in both direct and indirect costs. Last year alone, that hard dollar total was $183 million, with another $248 million in softer savings and cost avoidances.

SAVINGS HELP MAINTAIN OPERATIONS AND MISSION OPTIONS

As I mentioned at the start of my comments, these and other savings have helped us maintain our operational mission responsibilities despite the budget cuts of the last few years.

Our tritium operators continued their unblemished record of 100-percent, on-time delivery without a single reliability problem with a weapons system in the field. We didn't do it by taking shortcuts. Last year, the Defense Nuclear Facilities Safety Board called our order compliance at the new Tritium Facility a "role model" for the rest of the DOE complex. In addition, we've started up a number of other key nuclear facilities. No one else in the complex has a better record.

Just last month we began to stabilize some 80,000 gallons of highly radioactive solutions in our F canyon in a restart that DOE called "the best" they've observed. Our plutonium 238 scrap recovery and oxide conversion facility successfully started up in 1991, and has completed production of plutonium 238 to meet the energy source requirements of the Cassini deep space exploration mission. It continues to produce more fuel for other NASA needs.

Our Saltstone low-level waste treatment facility has operated almost flawlessly since it started in 1990, processing more than 1.5 million gallons of waste.

DWPF READY TO START

Our Extended Sludge Processing Facility has safely processed almost ½ million gallons of radioactive sludge that will be the initial feed for our Defense Waste Processing Facility which is now within days of starting. When it starts, around the end of the month, it will begin to stabilize in glass the 34 million gallons of liquid, high level waste we've stored in tanks since the site began operating in the 1950s.

We're also solving our waste problems by re-engineering our processes to drive down the waste we generate in the first place. It also cuts costs. Low-level waste generation at Savannah River has decreased 65 percent in the last 7 years. In addition, over the last half decade, we've reduced mixed waste 65 percent, hazardous waste 60 percent and sanitary waste about 30 percent.

We're enjoying similar results in our environmental restoration program—including remediating 14 waste units under RCRA—by getting 20 percent more work for the same amount of money we were spending a few years ago.

SAFETY RECORD BEST IN DOE

Throughout these and other operations, we've maintained an industrial safety record that's the best in the DOE complex. We're three times better than the rest of DOE, and nine times better than industry in general. We've improved radiological contaminations and controls in the workplace dramatically, and cut employee radiation exposure by almost 40 percent—bringing our average employee exposures to only one fifth the Federal standard.

While these performance records help protect the health and safety of our employees, they also save money. Workers Compensation costs at Savannah River today are only about four cents an hour. That's about one tenth the national average.

As you can tell, I'm proud of what our people have accomplished at Savannah River, in spite of dramatically reduced budgets and a very unstable work environment. Working hand-in-hand with DOE, we've found ways to do more with less, and will continue to try to do so.

Today, however, we lie at a critical juncture.

MISSION OPTIONS DISAPPEAR WITH FURTHER CUTS

Further budget reductions cannot be made without critical mission capabilities going away. While we continue to pursue greater efficiencies, we're limited in what we can accomplish. Our practical absorptive capacity is gone. There's no more low hanging fruit.

At DWPF, for example, proposed near-term budget cuts—if continued in the future—will impact us dramatically. Consistently reduced spending rates, not only increase life-cycle costs over the entire waste stabilization campaign by almost $18 billion, they also string out our ability to finally empty waste tanks that are already well beyond their original 30-year design life. In fact, one current funding scenario shows that it will be the year 2065 before we're able to empty the last tank, which by then, will be almost 100 years old.

Similar funding scenarios draw out still other major environmental programs and threaten not only our compliance with State and Federal agreements, but also the excellent relationship we've worked closely with DOE to develop with our regulators over the years.

One of the most significant effects of additional budget cuts is our ability to maintain the capability to meet new or consolidated missions you'll probably ask us to take on in the future.

Right now, we're involved in more than 10 separate processes under the National Environmental Policy Act. Each one identifies Savannah River as a candidate for critical missions that still need to be done. Those missions range from storage and disposition of weapons usable plutonium to the disposition of highly enriched uranium inventories. Particularly in the area of plutonium and tritium, SRS is the last operating facility with the experience and infrastructure in place to handle many of the tasks that are still needed to support post-Cold-War stockpile needs.

In the years since the end of the Cold War, we've juggled resources to preserve the core competencies and capabilities we need to keep those options open to the country. Further cuts beyond 1996 levels will force us to foreclose our ability to deal with some of them—not only concerning some of the operational issues I've just outlined, but also due to an exodus of critical skills from the site—which over the past 3 years, already has resulted in the loss of more than 2,000 key technical and operational personnel which have skills unique to our site and its technologies.

CRITICAL TECHNICAL SKILLS LEAVING SRS

Among our most senior and experienced scientists alone, almost 300 have left the site in the past 3 years. More than 500 of our most experienced engineers have departed as well. Many of those people are irreplaceable, with experience that can't be recovered once it's gone.

This exodus isn't limited to formal periods of work force reduction. The climate of budgetary uncertainty is prompting our most mobile, in-demand people to leave in a steady stream as other companies and industries recruit them. Since our last reduction in force this past summer, another 200 key technical people have left the site for more stable employment elsewhere.

In closing, I'd like to leave the committee with a few final thoughts.

LOOK AT ISSUES FROM A COMPLEX-WIDE PERSPECTIVE

In your deliberations, please focus on issues that are complex-wide in nature—not simply site-by-site considerations. Pay particular attention to those capabilities that—although part of the EM budget—go beyond just clean-up and involve operating facilities. I urge you to take into account those things we need to do to maintain *your future* mission options—not just current operational needs. Cut us further, and critical mission capability goes away. So do people—particularly those in our most critical, in-demand technical areas.

In spite of all this, we will continue to do whatever we can with the resources you provide us. We'll do everything we can to meet the missions you assign to us as efficiently as possible.

Our people are strained, but still responsive. Anything you can do to provide them stability can only help that responsiveness, and our ability to maintain the vital capabilities needed to complete the operational and clean-up tasks you assign to us.

Thank you.

Senator KEMPTHORNE. Mr. Schwallie, thank you very much.

Mr. John Denson. Mr. Denson is President, Lockheed Martin Idaho Technologies. John, welcome.

STATEMENT OF W. JOHN DENSON, PRESIDENT, LOCKHEED MARTIN IDAHO TECHNOLOGIES

Mr. DENSON. Thank you, Mr. Chairman. Thank you for a couple of things: for your leadership and support in the 1996 budget, which greatly helped all the sites, and also for the leadership and support of this committee in the historic agreement between the State of Idaho, the Navy, and the Department of Energy, which not only let the Nuclear Navy Propulsion Program continue unabated, but also gave a path forward for the Idaho National Engineering Laboratory to proceed with its environmental management activities.

We were awarded this contract in August of 1984, and actually took charge on October 1, 1994. We made a commitment to DOE when we accepted the contract. In our proposal, we said that we would save $742 million in the first 5 years of the contract through efficiencies and reductions in the activities, while maintaining the scope of work.

I would like to give you the results of the first year in that activity. First, we right-sized the organization. We consolidated the contracts and right-sized the organization. We accelerated our planned schedule by 3 years. At the end of the first year, we had 1,500 less people on the contract. This was not an initiative in the budget. This was an initiative to make the site more efficient and more effective.

There were no involuntary separations. We created voluntary retirement, and voluntary separation and attrition took care of this. The results of that particular activity is an estimated savings of $550 million over the 5 years of the contract.

Second, we re-engineered the environmental management baseline. There were five contractors there, and they all had an environmental baseline that was put together. We used Lockheed Martin's systems engineering and integration techniques to vertically and horizontally integrate the site, and to prioritize and establish and prioritize requirements and to tie cost, scope, and schedule to those requirements.

The result of that activity was a $400 million savings over the first 5 years of the contract, and a $7 billion savings over the 40-year life of the program. In addition, we will be removed from the National Priority List in the year 2010, 9 years ahead of the plan.

Currently, my integration team is integrating the Governor's agreement into this baseline, and we are currently briefing that to DOE, and soon will have it to headquarters, and then let you know.

Some other specific things we did: When we got there, the environmental restoration program was 20 percent restoration and 80 percent studies. Last year, it was 80 percent restoration and 20 percent studies. Our target is 85 percent of the money going to real, hard restoration programs. We met all the compliance milestones in front of us.

We reworked or removed 120 underground tanks 2 years ahead of schedule at one-half the budget. We completed the spent fuel movements, which are a court-compliance milestone, 3½ months ahead of schedule, and below budget. We moved the transuranic waste in the RCRA storage facilities 40 percent below the estimated budget for that job. Using commercial incineration of low-level waste, and not doing it ourselves, we saved 55 percent of the cost per year, or about $15 million over the life of the contract. By combining our decommissioned and decontamination efforts, we saved $2 million a year.

That sounds like a lot, but I believe we could have done more but for some impediments that I think fit before this committee, and I would like to make some suggestions about three impediments that I think could be fixed. The first one is budget instability. The second is funding inflexibility. The third is lack of incentives to save money.

Budget instability, what does it do? It causes you to replan. I have replanned my fiscal year 1996 budget four times now. I will be replanning parts of it for the rest of the year. Without the stability, we waste a lot of assets just replanning budgets.

The second thing, if you do not have stability, you cannot make a long-range plan, such as Don Ofte said. He has got a 10-year plan. Without stability in budget, that plan will bounce around on him. So we need a way to stop replanning and get a good plan in place we can support.

The second item is funding inflexibility. I cannot move money around and I cannot make real-time decisions. If I have in my budget $4 million in this pot in this project and I only need $3 million, and $3 million here and I need $4 million, I cannot move that money. It has to go back into headquarters. Maybe it comes back and maybe it does not.

I think that we need the flexibility at the site for the site manager to make real-time decisions against the priorities that they have at the site. I would suggest to your committee that you look at a little experimental program, and give a couple of the sites 25 percent flexibility to move funds, with some limits on it, and run it for a year. See if we cannot manage this. You will probably get some money back, because that is an efficient way to do business.

Thirdly, incentives. There is no real incentive to cut these dollars and cents back as you move along. At the laboratory, we need money to reinvest in the future of the National Lab. So I would propose an incentive like this, at least for my lab, that for every dollar we save, you allow us to reinvest 50 percent into the things that we need to, to either create a future for the lab or accelerate the cleanup that we have going on at the lab. But we make that decision based on the priorities we have at the site.

So those are the things I would suggest to you, Mr. Chairman. I thank you for allowing me to be here, and I strongly recommend your continued leadership and support to Mr. Grumbly's full budget that he submits.

Thank you.

[The prepared statement of Mr. Denson follows:]

Prepared Statement by W. John Denson

Good afternoon, Mr. Chairman and distinguished subcommittee members. My name is John Denson, president of Lockheed Martin Idaho Technologies. I'd like to thank you for inviting me to share my experiences at the Idaho National Engineering Laboratory as you prepare for deliberations on the 1997 budget request regarding DOE's environmental management program. I'd also like to express my appreciation for the leadership you have demonstrated in assuring a adequate EM budget for 1996. while I recognize the tremendous budget pressures faced by the congress ad mixed reviews on the Department of Energy program, I hope to present evidence today that the taxpayers' investments at the INEL are being managed cost-effectively and with measurable results.

I'd like first to provide a brief background on the Idaho National Engineering Laboratory and our unique contract with the Department of Energy.

SITE BACKGROUND

The Idaho National Engineering Laboratory is physically the largest of the Department of Energy's nine multi-program labs. Our 890 square miles make us nearly three-fourths the size of Rhode Island. In existence since 1949 when we were known as the National Reactor Testing Station, we have a long and proud heritage of service in the national interest. It was, after all, in Idaho that the propulsion system for the Nautilus was developed. It was here that over one billion dollars worth of highly enriched uranium was recovered through reprocessing. It's Idaho that the Nuclear Navy has depended on since its inception to inspect ad temporarily store its spent fuel . . . and where, for more than 30 years, sailors were trained to operate nuclear surface ships and submarines.

The INEL is also the site where 52 nuclear reactors were designed, built ad operated ad where the concept of atoms for peace through applications in industry and medicine found a willing and innovative home. As sterling as these and may other accomplishments have been, they did not come without an environmental price. More than one and a half million gallons of high-level liquid radioactive waste, thousands of drums of transuranic waste, and more than 260 metric tons of various forms of spent nuclear fuel are currently in wet and dry storage. One of the largest inventories of mixed wastes in the nation is also part of the waste management challenge at the INEL. All of these fuels and wastes must be responsibly managed and ultimately disposed of within the constraints of available budgets and compliance requirements.

The INEL is recognized throughout the DOE complex for its exceptional applied engineering capabilities. It is home to the greatest concentration of technical talent and resources in the northern Rocky Mountain region. Long known for our core competencies in sensors and control systems for non-proliferation. nuclear technology and operations, integrated environmental management, and systems engineering and integration . . . we're now the one-stop shop for the complex-wide system integration solutions that can save taxpayers money. Beyond these fundamental technological underpinnings, we're also the second largest employer in the State of Idaho . . . behind State Government.

THE INEL CONTRACT

Let me now address some of the unique features of our extraordinary contract with DOE. Awarded in August of 1994, the management ad operations contract at the Idaho National Engineering Laboratory called for the consolidation of the five previous prime contracts into one. Of note, the Idaho lab contract was the first of this administration to be performance-based . . . and serves as the flagship of Federal contract reform. There are a number of noteworthy objectives contained in the contract, but I'll just touch on a few of the highlights:

> First and foremost, we said we'd run the lab like a business ad that we should be measured against results, not process. We signed on to improve performance in the areas of environment, safety ad health . . . and to accelerate environmental cleanup by 9 years while reducing costs. We also took on the challenge of working to increase the lab's research ad development base . . . and wringing derived benefits from Federally developed technologies by moving them, where appropriate, to the private sector.

PROGRAMMATIC PROGRESS AND COMPLIANCE

So how have we done? Lockheed Martin Idaho committed to reducing operating costs at the INEL by $742M over the first 5 years of the contract while accelerating clean-up ad diversifying the R&D base at the site. We have taken the following actions to achieve these results:

(1) Through rightsizing, we accomplished in 6 months a 1,500 person voluntary personnel reduction we had originally planned to complete in 3 years. This reduction was accomplished while increasing contract scope, meeting or exceeding all compliance milestones. ad achieving significant cost reductions in operations;

(2) Reengineering of the requirements baseline through our EM integration effort shaved 400 million dollars off the fiscal years 1998–2004 full treatment baseline. That same effort will cut a prodigious $7 billion dollars off the lifetime EM budget profile for the Idaho National Engineering Laboratory—through the year 2035;

(3) The INEL is currently the only major DOE lab to have met every one of our Comprehensive Environmental Response. Compensation ad Liability Act milestones. Fuel movements from an outdated storage facility to a modern, compliant facility were accomplished ahead of Consent Order agreements. More than 120 underground storage tanks were removed, replaced or upgraded at cost and 2 years ahead of schedule. Waste drum movement at the Radioactive Waste Management Complex has been completed ahead of schedule and under budget by nearly 40 percent. The decision to pursue commercial incineration of certain low-level waste resulted in savings of over 55 percent. The consolidation of decontamination and dismantlement activities has netted savings of $2 million.

Further, when then-assistant secretary for Environmental Management Tom Grumbly appeared before the House Subcommittee on Energy and Power in October of last year to update members on nationwide EM progress, he pointed to accomplishments and practices at the Idaho National Engineering Laboratory on numerous occasions. When he talked about success in eliminating urgent risks in the DOE system, he pointed to our completed stabilization of 12 thousand liters of liquid uranium inventory and our successful transfer of 391 fuel handling units to a newer, more secure storage environment. On the subject of establishing a system that is managerially ad financially in control, he cited the Idaho operating contract ad its commitments from Lockheed Martin to develop new technology transfer and economic development initiatives, including the provision of millions of dollars in venture capital and the relocation of other corporate activities to the State. When he talked about demonstrating tangible results, he talked about deactivation of two facilities at our Idaho Chemical Processing Plant, with their associated savings of $24.5 million in the outyears. When he spoke of focusing technology development, he talked about the Idaho National Engineering Laboratory's role as Mixed Waste Focus Area Lead Lab.

In other operational matters not specifically mentioned by Mr. Grumbly, we've also succeeded in assuming the lead in national priority programs including the National Spent Nuclear Fuel Program, the National Trasuraic Waste Program ad the National Low-level Waste Management Program. Lead lab status has also been obtained in the Plutonium Focus Area and in Systems Engineering.

PROGRESS IMPEDIMENTS

As solid as these successes are, more could have been done if a few impediments could have been avoided—notably, the structural funding barriers or "stovepiping" in the environmental management world. Had environmental management integration been in place, we could have been more flexible ad responsive with scheduling concerns. We could have kept technology development needs more connected. We could have assured that risk was the primary focus in determining priorities and action plans.

Additionally, the Idaho National Engineering Laboratory has been hampered by the lack of direct sources for Laboratory-Directed Research ad Development, inflexibility on budget matters for DOE field managers or contractor management, ad the inability to reinvest savings for the future. I'll address these subjects in more detail a bit later.

BUDGET

Now, I'd like to examine the impact of reduced carryover funding ad continued declines in out year funding. The overarching concern we have about constricted funding has to do with the ability of the Idaho National Engineering Laboratory to live up to its compliance commitments . . . particularly those laid out in the landmark spent fuel ad waste management agreement of October 1995 among the U.S.

Navy, the Department of Energy ad the State of Idaho. In exchange for Idaho allowing the resumption of shipments of DOE spent fuel into the State, a series of costly commitments were agreed to by the Federal parties to the pact. Estimates are that the major activities and projects committed to in the agreement will add 200 million dollars to established budget targets over the next 5 years alone. It must be pointed out, though, that the total cost for the EM programs would have been much higher had it not been for the previously mentioned re-engineering conducted by Lockheed Martin. which resulted in a 5-year reduction of $400 million. All of which means we still have a net savings of $200 million, even with the agreement.

Failure to comply with the full terms of the agreement would result in suspension of further shipments and, ultimately, daily fines of $60 thousand. Beyond sending a undesirable message to the people of the State of Idaho about the prudence of entering into agreements with the Federal Government, the kind of funding limitations or reductions that would jeopardize the spent fuel agreement would likely have other, serious ramifications. These could include compromising the Lockheed Martin Idaho Technologies contract commitment to accelerate the cleanup of the INEL by 9 years. Restricting our ability to maintain a core mass of critical technical personnel could also be severely compromised, substantially escalating our the challenge to enhance economic stability in eastern Idaho. Finally, the National Security impacts on the Navy's nuclear propulsion program could be immeasurable.

MAJOR ISSUES

That said, let me focus a bit more intently on the major issues of concern for Lockheed Martin Idaho Technologies in its operation of the Idaho National Engineering Laboratory. Lockheed Martin was initially attracted to the idea of managing and operating the Idaho National Engineering Laboratory because of the lab's unique applied engineering status and its ability to serve as a experimental test bed for new policies, methods and directions for Government and industry in the post cold war era. We came in seeking to become the applied engineering development center for environmental management-related technologies—technologies that would meet the current needs of DOE, and then be made available as derived benefits through broader industry and societal applications.

We also came in believing that the technological base developed through the environmental management programs in Idaho has the potential to help reduce U. S. offset obligations for defense ad aerospace exports. Lockheed Martin well understands offsets and the value of the process. Lockheed Martin Idaho has already had a successful offset transition through its Technology Exploitation Pilot Program and would like to be able to extend that record to other offset obligations. Finally, we came in believing that we would have the kind of flexibility needed to really run the lab like a business.

OPPORTUNITIES FOR IMPROVEMENT

Now, I'm not suggesting that we've had to set those beliefs ad plans aside, but I am here to tell you that we're going to be hard-pressed to carry out our efforts to improve our operations ad the system without your help.

We need assistance in the area of Laboratory-Directed Research and Development or LDRD. Funding in this area at the Idaho National Engineering Laboratory frankly needs to be augmented so we can maintain and extend our focus on missions of national significance. This augmentation is also necessary to retain and build the quality of our technical force at the lab and to continue to partner with universities in maximizing return on the investment of Federal LDRD dollars. Maintaining the lead in moving environmental management technologies from the study to work stages in the constantly evolving world in which we live simply demands stamina or stability in LDRD funding. The major side benefit of LDRD investment is stimulation of the movement of intellectual property to outside sources for derived benefit.

Savings re-investment is another area of importance to us. In our innovative performance-based contract we signed on for savings of $742 million over 5 years . . . and we're well on our way to delivering that. As part of the deal we suggested we needed to be able to invest $400 million of that savings amount in establishing new missions and a new future for the Idaho National Engineering Laboratory. Of note, we were planning to direct 170 million of the total investment "pool" to Laboratory-directed Research and Development.

This whole area of reinvestment needs to be seriously looked at. Currently, hard direct cost reduction incentives are at an immature stage. More often than not, direct program savings are now pulled back. We believe that incentivizing reductions in direct costs (without penalizing scope and schedule) ad at the same time providing a portion of those savings to conduct Congressionally pre-approved. Though unfunded research, would be a effective way to reduce costs to our customers and keep our technological base and people.

Greater flexibility in budget matters for DOE field managers or management and operations contractor management would do much to improve our operations and the entire DOE system. In fact, we're proposing an innovative pilot test of budget authority. We'd like to be granted a 6-month period of time to experiment with moving dollars around with only field, versus headquarters concurrence. At a time when maximum budget agility is accepted practice in the private sector, we believe the Idaho National Engineering Laboratory is the place to try the concept out in the Government sector.

Our record in prudently responding to such "test bed" opportunities is solid and, I think, warrants trust that we would handle this budget flexibility test in a similarly appropriate fashion. After all, it was within 2 months of our being awarded the contract to operate the Idaho National Engineering Laboratory that Secretary O'Leary personally granted us authority to test the Technology Exploitation Pilot Program for a 5-year period. In a nutshell, this technology pilot allows us to "wiggle the dials" a bit to see if there might be better ways of moving technologies and technologists back and forth between the Government and private sectors. When all is said and done, this program should have complex-wide implications for improving the efficiency and cost effectiveness of moving national-need technologies to the derived benefit applications where they can have the greatest impact.

Additionally, when lead lab designations are made, budgets should come with them. To live up to the reasonable expectations of Congress and taxpayers, we need to have the budget authority to truly embrace our national lead lab designations and employ our unique systems engineering strengths to solve problems—to produce results. Designations without associated funding is hollow, at best.

Finally, we'd like to ask your consideration of granting full budget authority for multi-year program and construction projects. Ramping major national need projects up or down each year is not an effective way to do business and make the kind of schedule compliance our stakeholders have come to expect from us almost impossible to deliver. If we are to continue to deliver on our wide-ranging environmental management commitments and milestones, we simply must have this full multi-year budgeting authority.

NEAR TERM INEL OBJECTIVES

While you work on partnering with us to make the system better, we're committed to carrying out some very significant and challenging objectives. We are, for instance. unequivocally dedicated to executing our portion of the 1995 spent fuel and waste management agreement between the State of Idaho and the Federal Government. Properly handling and managing the hundreds of Government-owned spent fuel shipments, treating and transferring existing wastes at the INEL and developing the requisite technologies referred to in the pact will be arduous tasks, but with Congressional funding support. we will be able to properly handle them.

We are similarly committed to establishing an enhanced research and development base. Rather than duplicating the essential work already underway at other national labs, we will leverage our applied research and engineering, systems integration and testing, evaluation and operations capabilities to support those other labs and their work in fundamental science and basic research and development.

Environmental cleanup is a crucial objective for us, because we are the environmental management lead lab. As I've mentioned previously, we've pledged to accelerate cleanup by 9 years—effectively removing the Idaho lab from the National Priorities List by 2010, instead of the initially planned 2019. With funding support we will succeed here, too.

In a closely related area, we're working to establish the Idaho National Engineering Laboratory as the leader in supporting environmental management programs and budgets across the DOE complex. Again, this will be possible due to our ability to leverage our unique systems engineering and integration capabilities. We are and will continue to be the source of systems solutions to the pressing environmental management challenges confronting the Department of Energy.

CONCLUSION

In closing, I'd like to talk about what I think Lockheed Martin brings to the Idaho National Engineering Laboratory and to Government service in general. I'd also like to share my thoughts on the long-term role of national labs.

Lockheed Martin, in my estimation, was chosen to run the Idaho National Engineering Laboratory due in large part to its woven ability to take on large programs of national importance . . . and to succeed. Our corporate motto of, "Mission Success," is not empty promotional banter. It is, rather, the commitment of the nation's premier diversified high technology company to deliver affordable solutions that get results. The synergy now possible with Lockheed Martin's management of not only the Idaho National Laboratory, but also of Oak Ridge and Sandia will bring about results never before possible.

Although there has been much talk about the proper role of the national labs and even if they should be preserved, I believe DOE's national labs, particularly the Idaho National Engineering Laboratory, are irreplaceable American treasures. They are uniquely able to do the long-term, high-risk work that no one else can or will do. They provide broad benefits and impacts in priority areas including national, energy and environmental security. They also provide the underpinnings for continued U.S. technological competitiveness in world markets.

With your support, the Idaho National Engineering Laboratory can remain in compliance—particularly with the Federal court-guided 40-year agreement between Idaho, the Navy and the DOE. The lab can continue to achieve the kind of solid programmatic progress that has become the hallmark of operations since Lockheed Martin assumed management responsibilities in the fall of 1994. We can maximize return on Federal budget investment and most importantly, can continue to provide our unique systems engineering and integration expertise to matters of national importance . . . all as Idaho's and America's NATIONAL ENGINEERING LABORATORY!

Thank you for your time and your willingness to consider the requests I've placed before you this afternoon. Good day.

Senator KEMPTHORNE. Good. Mr. Denson, thank you.

I would note, when I was Mayor of Boise, I had a program similar to what you have just described, where the department heads, with any savings they found in their capital budget, for example, they could then have flexibility to purchase other items; 50 percent of the savings, 50 percent came back to the general fund. It was wonderful because it raised morale. It allowed us to acquire necessary equipment. But it saved money for the taxpayers. It was very much a win-win. So I appreciate you mentioning that. It is along those lines of what we are looking for, in new ideas, new ways of trying things.

And, too, pilot projects: If we cannot sell it across the board immediately, then let us just go show that it does work.

OK, Mr. Robert Card. Mr. Card is the Executive Vice President, Kaiser-Hill Company, Rocky Flats.

STATEMENT OF ROBERT G. CARD, EXECUTIVE VICE PRESIDENT, KAISER-HILL

Mr. CARD. Thank you, Mr. Chairman.

Kaiser-Hill took over Rocky Flats on July 1st, and has achieved many accomplishments since then with a reduced budget. Some of these accomplishments are included in my written testimony, but here I would like to focus my oral testimony on where we want to go.

We believe that forming projects out of potentially short-term closure actions, such as they have done at Fernald, and like Rocky Flats, can yield large payoffs for the at-risk stakeholders and for the taxpayers. Importantly, the Kaiser-Hill project proposal that I will discuss will, in 9 years, release all but $50 million of the current annual budget for traditional defense or other environmental restoration needs.

This project concept and the concept of cost reduction and performance increase is facilitated by DOE's pay-for-performance contract reform initiative, which we strongly support. As you have heard from my colleagues here, 85 percent of Kaiser-Hill's fee is based on the achievement of meaningful and measurable accomplishments.

An example application of the project concept is Rocky Flats. In the top photo of the exhibit you see the site at it exists today. It contains 14 tons of plutonium, more than any other site except Pantex, 50,000 containers of waste, and 7 major contaminated buildings. You are seeing the pretty view to the Rocky Mountains there. All of this, however, in the reverse direction, is upwind of 2.2 million Denver-area residents, and upstream of the water supply of the North Denver area.

In our project concept, we ask the question: When can the innocent downwind stakeholder erase Rocky Flats from the map from a risk perspective?

Unlike many other sites, the citizens around this site are not dependent on it, and do not derive the same emotional or economic benefits as some of the other facilities. The answer to that question, of when they can stop worrying, is less than a decade, under our proposed approach, versus up to 70 years or more under the previous approach that was existing when we took over.

With our best-in-class subcontractors, we can convert the site into the second photograph—these are all included in the written testimony—in 9 years, for less than $7 billion, which is $3 billion more than the current worst-case funding scenario, and includes an estimate for the DOE field office budget. This will leave a long-term operating liability of less than $50 million per year, versus the current nearly $700 million per year annual budget. The previous estimate for this work was greater than $20 billion, taking the better part of a century to complete.

Another way to put this in perspective is that while $7 billion is a very large project, it is only $1 billion more than the site will have spent in the 8 years since production stopped, while achieving relatively little risk and mortgage reduction.

Looking at the scenario, on that chart, that achieves these results is shown by that top line. Unfortunately, we fear the bottom funding line, with no serious reduction risk, may be inevitable due to budget pressures unless elected and executive policymakers adopt a different strategy.

The bottom funding line, representing about $400 million per year, is less than the current site baseline—that is, the mortgage cost—which is currently about $500 million per year, including DOE's field office budget. That is what is required to maintain our safety envelope. We should, and will, reduce this baseline cost. We have already cut more than $50 million from it since we took over. However, we do not think that we can beat inflation's effect to preserve meaningful progress under that scenario.

The bottom scenario generates the extreme case of only buying continued maintenance and very little liability reduction for $4 billion over the same 9 years, as opposed to completing it for an added $3 billion. It is important to note that in defining the cleanup project, managing it as a project will be useful to us under any of those funding scenarios.

I would just like to mention, in summary, some of the other recommendations in our written testimony.

First, unfencing the funds, as Mr. Denson has said. We are pleased to hear that Mr. Grumbly is going to propose essentially doing that by funding Rocky Flats through the environmental restoration account for fiscal year 1997. But I would encourage you to look at that for other closure sites as well.

Making timely decisions on plutonium and other radioactive waste disposition, that we heard about earlier, makes it difficult to plan. For us, it makes it more difficult to plan than even the funding problems that Mr. Denson described.

Three, enabling private capital for part or all of the project. We are willing to commit private capital for part or all of this project if we can achieve the funding return that we need for it.

Fourth, reviewing labor-management practices to verify that appropriate tradeoffs are made between employment stability and cost-effective and timely risk reduction.

Fifth, encouraging the development of nuclear regulatory protocols for the closure and decommissioning of DOE facilities. Most of them were written for operating or constructive facilities.

And, sixth and last, enabling streamlining of the regulatory process. Which, by the way, I think at Rocky Flats we have pretty well in hand, as Mr. Grumbly said.

In closing, I want to emphasize that Kaiser-Hill is ready to go on this project now. We have a best-in-class qualified team on board that was selected to do this work. We have an efficient and effective contract vehicle in place. We do not need new technology to accomplish the work. Our estimate includes the construction operation of state-of-the-art, safe and secure plutonium and waste storage facilities to mitigate even decades-long delays in decisions on permanent repositories.

Thank you.

[The prepared statement of Mr. Card follows:]

PREPARED STATEMENT BY ROBERT G. CARD[1]

Good morning, Mr. Chairman and members of the subcommittee. My name is Bob Card; I represent Kaiser-Hill, where I serve as Executive Vice President. I am delighted to have the opportunity to testify before you today and to share Kaiser-Hill's experience as a DOE contractor focused on cleaning up Rocky Flats, and to offer some suggestions for improving these efforts and saving significant taxpayer dollars. I want to deliver three basic messages today:

- First, DOE's Contract Reform Initiative, which includes a new way of structuring its relationship with its contractors at former weapons complex sites, has led to more cost-efficient and innovative approaches for addressing the Department's changing mission.
- Second, a careful analysis of the safety, health, and environmental risks at Rocky Flats, as well as the potential costs of cleaning up and closing down the site, reveals that TIME is the single most- critical factor in keeping both the costs and risks at the lowest possible level. In other words, the longer it takes, the more it will cost and the greater the life-cycle risk will be.
- Third, there are both legislative and institutional barriers to achieving the lowest-cost, highest- quality, -most-expeditious cleanup of this site. Many of these barriers are ones that Congress can remove.

Because Secretary O'Leary has recently stated that Rocky Flats will never return to a production mission, I believe that the optimal way to put Rocky Flats on a sure path to fast, cost-effective, safe shutdown is to treat the site's closure as a project. I recognize that the large sums that this Committee authorizes for environmental cleanup is money that is unavailable for the defense mission. However, with a modest incremental investment now in a Rocky Flats project, either as a pilot project, or as an across-the-board strategy for closing sites, Congress will more quickly be able to deal with the legacy of our Nation's having won the Cold War and put future funds back into the traditional defense mission.

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[1] A biography of Mr. Card is in Attachment E.

To set the stage, I would like to describe Kaiser-Hill's unique contract; DOE's Rocky Flats Environ mental Technology Site (Rocky Flats); the situation that existed when Kaiser-Hill became the site's first the integrating management contractor on July 1, 1996; what has occurred at Rocky Flats in the intervening 8 months; and where we would like to go with our customer, DOE, and with the Congress during the rest of our 5-year contract.

THE DOE/KAISER-HILL CONTRACT

Kaiser-Hill's contract with DOE is the first of its type. The company acts not as the traditional management and operations contractor, doing everything required by DOE at the site, but rather as an integrating contractor, managing the work of subcontractors selected to do specific tasks because of their expertise. Moreover, the contract is based on performance, so Kaiser-Hill receives its fee only when it achieves certain pre-approved measures, instead of the previous DOE model cost-plus-award-fee system. In Attachment A to this testimony, you will find more information on the Kaiser-Hill team and its Integrating Management Contract with DOE for Rocky Flats.

ROCKY FLATS OVERVIEW

Next to DOE's Hanford Reservation, Rocky Flats is DOE's biggest, most complex former nuclear weapons complex site slated for closure. The 6,500-acre Rocky Flats sits only 15 miles from the center of Denver, Colorado. The growing suburban community is literally knocking at Rocky Flats' doors; in 1994, 2.2 million people lived within 50 miles of the site's border. Rocky Flats' location presents unique security challenges and risks to the urban population, while the facility itself poses difficult technical problems because of the 14.2 tons of plutonium on site, which includes DOE's largest inventory of unencapsulated plutonium. DOE and the Defense Nuclear Facilities Safety Board concluded in 1994 that four of the ten most dangerous buildings in the weapons complex were at Rocky Flats, including the two most dangerous. Moreover, Rocky Flats has a lingering negative image in the surrounding community, in part as a result of the 1989 FBI raid at the site that led to DOE's contractor pleading guilty to environmental crimes. Rocky Flats was listed on the Superfund National Priorities List in 1989.

The site's fiscal year 1995 budget was $777 million (M). The site's fiscal year 1996 budget is now expected to be $699M (a reduction even from last fall's projection). Of these amounts, approximately $450M in fiscal year 1995 was, and less than $400M in fiscal year 1996 will be, applied directly to the "mortgage," i.e., the activities associated purely with keeping the lights on and the safety envelope intact. Although Kaiser-Hill has and is working hard to reduce the annual mortgage costs-as evidenced by the fact that the 1996 mortgage will be more than $50M less than in the previous year—not until we are able to exit the major plutonium buildings will the amount come down substantially. DOE spent $119M in fiscal year 1995 and has budgeted $146M in fiscal year 1996 to perform its oversight responsibilities and to make various required payments to surrounding jurisdictions and civic entities. Thus, only $208M in fiscal year 1995 was, and $163M in fiscal year 1996 is, available for use to do the mission work of cleaning up Rocky Flats and putting the site's plutonium and other special nuclear materials in safer storage.

As a Federal facility, Rocky Flats faces the heightened complexity in the regulatory structure with which it contends both because of the overlapping jurisdiction between EPA and Colorado's environmental agencies under the Superfund (CERCLA) and hazardous waste (RCRA) statutes and because of the additional overlaps from DOE's and the Defense Nuclear Facility Safety Board's authority resulting from the Atomic Energy Act. When Kaiser-Hill arrived at Rocky Flats, DOE had been negotiating to revise its cleanup agreement with EPA and Colorado for 18 months.

THE FIRST 10 MONTHS

During its rapid 60-day transition from successful bidder to contractor-in-charge, Kaiser-Hill operated under a fixed-price contract. The company's most significant achievement during this period was to complete a substantial work force restructuring involving voluntary and involuntary layoffs of over 1,400 of 6,000 contractor employees. With DOE's support, Kaiser-Hill designed this action to ensure a leaner work force better suited to the site's "Clean it up and Make it Safe" mission.

During our first 8 months on the job, Kaiser-Hill has generally accelerated the pace and increased the level of cleanup and risk reduction at Rocky Flats, with a significantly smaller work force and without any decrease in safety. This outcome has been enabled by the performance-based contracting approach resulting from DOE's Contract Reform efforts. Importantly, DOE has whole-heartedly supported the performance-based approach and our efforts to accelerate risk reduction at the site.

- We broke a 10-month impasse that had halted draining of plutonium liquids out of tanks; we have restarted this task,draining seven tanks, and have set an ambitious schedule for its completion, which we expect to achieve.
- We thermally stabilized unstable plutonium oxide and have shipped certain classified plutonium and machining parts off the site.
- We are completing preparatory efforts and are on track to exit two of the site's seven major plutonium/uranium buildings this fiscal year. As part of this effort, 6 tons of highly enriched uranyl nitrate will be shipped off the site this fiscal year.
- Our labor-relations specialists, in conjunction with union leaders, have developed a proposed allocation for site-decommissioning work among the various trade unions that should allow Rocky Flats to avoid scope-of-work disputes during the closure process.
- We completed the venting of stored drums containing high-plutonium-content residues and hydrogen gas. The venting was safely accomplished at plant-record production rates.
- We achieved real cleanup by putting people out in the field who moved dirt to remove one of the top ten most-hazardous individual cleanup sites at Rocky Flats. Named Ryan's Pit, this shallow dirt grave had contained hazardous and plutonium-contaminated debris and soils.
- We shipped record amounts of low-level mixed waste off the site, about 60 truck loads since July.
- We participated in crafting a long-term "Vision" for Rocky Flats. DOE, EPA, and the State of Colorado released the original concept paper in November 1995 and a new draft is expected to be issued for public comment next week. The Vision will guide the near-term determinations about choosing a path forward for cleanup and ultimate disposition of Rocky Flats. The Vision addresses land uses, waste management, cleanup, and other important issues. Public consensus regarding the path forward and endpoint should lead to Rocky Flats being able to direct funds towards meeting its cleanup and safety mission goals in a more efficient manner.
- To implement the Vision, we proposed a bold new approach for completing the bulk of the cleanup and risk-reduction activities as a project. This implementation strategy, if followed, could save billions of taxpayer dollars while expeditiously reducing the current hazards associated with the plutonium stored on the site. *Attachment B* contains a synopsis of this proposal and I discuss it further in this testimony.
- We participated in the negotiations of the new Rocky Flats cleanup agreement that will ultimately replace the site's existing interagency agreement. The new agreement will reduce substantially the number of enforceable regulatory milestones to focus on real work instead of paperwork and to recognize that out-year planning is not precise because of the vagaries of the Federal budgeting process. The agreement is premised on the commitments of DOE, EPA, and the State of Colorado to work cooperatively and openly with each other; to streamline the work-approval and dispute-resolution processes; and to use, to the maximum extent currently allowed under law, a single process with approval by a single regulator to expedite the paperwork and produce a bias for action. In addition, the new agreement wraps more of the work on the site under its umbrella, thereby simplifying the regulatory framework that DOE and Kaiser-Hill face. Also, the agreement sets preliminary cleanup standards that will guide work at the site for the next decade. Finally, the agreement includes as an attachment a ground breaking memorandum of understanding between the three signing agencies and the Defense Nuclear Facilities Safety Board to address the Board's role during decommissioning. A draft is expected to be issued for public comment next week.

WHERE WE WOULD LIKE TO GO FROM HERE

The complete change in mission at Rocky Flats should have led to a radical change in the work structure for the site. Unfortunately, the second transformation has yet to occur. The site is still in an "operations mode," when what it needs is to be structured like a project.

By operations mode, I mean that work is scoped, budgeted, and managed yearly, but without focus on an endpoint. Planning occurs when DOE identifies a new need, but not in the context of trying to complete the overall mission, because, in fact, one planning assumption is of an ongoing steady state. Thus, DOE and Kaiser-Hill are institutionally encouraged to view work only in the context of the year's activities. The analogy is to a military training facility or munitions factory, in which there is no mindset that the work will ever end.

In contrast, to treat the site as a project requires that Congress and DOE view Rocky Flats in its totality, as a unified set of defined activities with a beginning, a middle, and a finite achievable endpoint with an agreed-on total cost and completion date. Work would be viewed always in the context of a series of activities to accomplish the endpoint. The analogy here is to construction of a new military base, where building craftspeople come and go as needed. If one were to build a new base using the operations model, all building craftspeople would remain on the job site for the duration of base construction, a much more expensive proposition.

From a funding standpoint, Federal operations receive an annual budget, while Government projects traditionally have life-cycle budgets, even when they obtain annual appropriations. Similarly, while an operating contractor receives a fee for activities performed within a given fiscal year, a project management contractor is rewarded on multiyear accomplishments in the context of the overall project.

At Rocky Flats, Kaiser-Hill has been working to develop a project that would be consistent with the draft Vision for the site. The draft Vision presently describes a near-term, intermediate-term, and final site condition. At the end of the near-term phase, the bulk of environmental remediation would be completed, and the only DOE buildings left on the site that would be related to the defense mission would be two safe storage facilities—one for plutonium, pending a national decision on its disposition, and the other for transuranic waste, pending its shipment to DOE's Waste Isolation Pilot Plant (WIPP) or alternative disposition. The project that Kaiser-Hill is proposing would achieve this near-term site condition. *Attachment C* to this testimony depicts three pictures of the site-one today, a second showing the near-term site condition, and a third representing a final condition at the end of DOE's mission. Although the Vision is not final, the project proposal (Attachment B) that Kaiser-Hill has developed would accommodate all expected permutations of the Vision. Once the Vision is final, Kaiser-Hill would work with DOE as DOE works with its stakeholders, to ensure a project consistent with the Vision near term site condition.

There would be four main components of a Rocky Flats closure project:

1. *Urgent Risk Reduction/Special Nuclear Materials Management*

Stabilize, treat, consolidate, and safely store plutonium and highly enriched uranyl nitrates (HEUN) in shippable containers for eventual off-site disposition. Although all HEUN would be shipped off the site during the project, plutonium could remain on the site beyond the 9- to 15-year project term.

2. *Waste Management*

Build retrievable, monitored storage facilities for containerized transuranic wastes and for non remediation, low-level radioactive wastes, as well as a Corrective Action Management Unit (under the Resource Conservation and Recovery Act) for remediation wastes—other than transuranic materials—and building debris. Ensure that the transuranic waste is ready for shipment to WIPP by 1998 and ship as much as DOE will allow if WIPP does open. Ship other hazardous and solid wastes off the site, as generated, to commercial facilities.

3. *Facility Decommissioning*

All contaminated buildings would be deactivated; decontaminated; dismantled; and either demolished or, if feasible and appropriate, designated for non-mission future uses. Uncontaminated buildings would be deactivated and either demolished or designated for future uses.

4. *Environmental Restoration*

Consistent with the land uses described in the Vision, clean up or close all existing landfills and individual contaminated sites, while protecting surface water, minimizing the migration of groundwater contamination, addressing soil contamination as needed to eliminate additional water contamination, and providing a robust environmental monitoring system to demonstrate that the overall remediation conforms with the risk-reduction goals and cleanup levels established for the site.

THE ADVANTAGES OF STRUCTURING ROCKY FLATS LIKE A PROJECT

Perhaps the greatest advantage of treating the Rocky Flats cleanup as a unitary project would be that, as discussed above, DOE, Congress, and the public could look at the path forward and see an endpoint. Moreover, because one of the current motivational problems that exists at Rocky Flats stems from having no recognized national imperative to close the site quickly, creating a project to do just that would have psychological benefits for all involved.

Several financial benefits also arise by using the project structure. I believe that using a project funding structure will maximize the leverage for each dollar Congress authorizes and appropriates. In evaluating the efficacy of making Rocky Flats into a project, DOE and Congress should measure the project proposal against alternatives using the present value of the total program costs, appropriately discounted. I am confident that the project structure will be the most advantageous of the options. Treating the closure as a project also will enable Rocky Flats to more flexibly target funds to the highest priority requirements at the site, thereby resulting in a more efficient use of limited dollars. As described below, moving to a project structure may lend itself to using outside sources of money. A companion mechanism for providing Rocky Flats with the flexibility to treat the cleanup like a unitary project would be for Congress and DOE to fund the site's budget entirely in a single line item, preferably Environmental Management's Defense Environmental Restoration account. By giving the site a budget that is effectively without funding fences, Congress would be maximizing DOE's flexibility to address the highest-priority and most-cost-effective activities in a given year.

If Congress allows the Rocky Flats closure to proceed as a project within a single line appropriation, Kaiser-Hill believes that it would enhance our ability to provide adequate cost accountability to DOE and Congressional overseers. Kaiser-Hill hired Arthur Andersen and Dun & Bradstreet to conduct an audit shortly after assuming its job at Rocky Flats. These firms confirmed that the financial tracking systems the company inherited are antiquated and not capable of providing the appropriate level of accountability. Kaiser-Hill will be giving DOE a plan to reform the financial systems, along with an implementation strategy, this month; DOE expects to choose an option within 30 days. The option would be implemented modularly during the following 12 to 15 months. Kaiser-Hill recognizes that the financial systems Rocky Flats currently uses are weak; we will have something better in place during 1997.

In the meantime, however, Rocky Flats has one of the lowest percentages of uncosted balances for a major DOE facility and is staying within the parameters of the DOE order regarding such balances. For this reason, any significant reductions in carry-over funding may adversely affect Rocky Flats' ability to meet its regulatory commitments.

KEYS TO ACHIEVING CLOSURE FASTER, BETTER, CHEAPER, AND SAFER

There are several areas in which I believe we need Congress' assistance to stay on track toward reaching the goals Congress and DOE expect to achieve at Rocky Flats.

1. Budgeting and Creating a Project

When Kaiser-Hill was awarded the contract in April 1995, there was a strong call for action and vision at the site. The official closure cost in the DOE Baseline Environmental Management Report (BEMR) was $22.5 billion, and the cleanup would not be completed until the year 2065. The unofficial cost recognized by the site's submittal to the BEMR was $35 billion by the year 2080. With these long timeframes, the site was caught between the need to maintain and upgrade the buildings to last most of another century versus accomplishing risk reduction. DOE and the Defense Nuclear Facilities Safety Board (DNFSB) noted the dangers and diseconomies of this approach, and the stakeholders were impatient as little cleanup had been accomplished in the 5 years since production ceased.

The decision makers have several choices when considering the budget for Rocky Flats. At one end of the spectrum is funding the project and at the other end is continuing long-term mortgage costs. As shown in the attached cost-curve chart (Attachment D), which depicts four budget profiles for achieving the same endpoint, the longer it takes to fund cleanup, the more it will cost and the longer the site will be at higher risk. For $6.7 billion, DOE and Kaiser-Hill could close Rocky Flats in 9 years. A 9-year project would require as much as $300M more in 1 fiscal year than is being provided, but the overall project cost would be $13 billion less than a project with a flat funding of $400M per year. A 15-year project, by contrast, would cost $8.8 billion total-more than $12 billion in savings from the $400M annual flat-funding scenario, assuming 8 years at a $700M site budget. If one thinks of this cleanup as a capital project, the notion that it will cost more at the beginning (i.e., require front-loading) is not surprising. If there is a commitment to budget for the project, Rocky Flats will be cleaned up and off the books, or nearly off the books, sooner, leaving more money for other national priorities.

The cost-curve chart illustrates how delaying the infusion of funds to a Rocky Flats cleanup project could leave the site with insufficient funds to effect closure, thereby requiring constant mortgage payments. A decrease in funding Rocky Flats during the next few years would mean that Kaiser-Hill may not be able to continue to make meaningful progress towards closing the site. Instead, the reduced funding may permit only maintaining a mothballed site that would represent a continuing liability for the U.S. Government, even though Rocky Flats no longer has an active production mission.

2. *Making the Collateral Decisions*

One reason that Rocky Flats faces difficult choices in determining how to clean up the site is that no places are known for disposing of many of the materials and waste types stored at the site and expected to be generated during the cleanup phase. For example, Rocky Flats stores 5,000 drums of transuranic waste Although DOE expects to open the Waste Isolation Pilot Plant in New Mexico by 1998, it is widely speculated that this date will slip. In the meantime, Rocky Flats cannot plan with any certainty regarding the future of the transuranic wastes on the site. Similarly, DOE has yet to make a decision on the national level regarding the future of its surplus plutonium inventory. Because of the 14.2 tons of plutonium at Rocky Flats, the resolution of this issue is another critical element without which planning becomes difficult, either in terms of the timing for removing plutonium from the site or in terms of the appropriate strategy for storing the plutonium in the interim.

3. *Restructuring the Work force and Labor Management*

This Committee passed work force restructuring legislation, section 3161 of the 1992 National Defense Authorization Act, to address the transition of the weapons complex from production to cleanup. DOE guidance has expanded these requirements. Rocky Flats has effected two work force restructurings since DOE ended its production mission in 1992, the most recent of which occurred by Kaiser-Hill's direction immediately before the company assumed its role as integrating management contractor. Although the new mission for the facility has now been set for several years and is unlikely to change in the future, the statutory and agency requirements continue to apply. These requirements, including those that emphasize retraining of current workers for other work on the site (as opposed to in the outside community) rather than hiring employees with expertise in the specific tasks scheduled for accomplishment, are proving costly and time-consuming. The site is struggling to adapt its large, stable, highly skilled and specialized work force to the wide swings in employment needs that have already begun to occur and will continue throughout the massive deconstruction that must take place at Rocky Flats.

While I recognize the legitimate social and economic concerns that arise when Congress decides to close a military facility, it must also be recognized that the labor management practices for DOE facilities provides one of the greatest cost differentials from a commercial approach to cleanup. Because every dollar spent at Rocky Flats is a safety dollar, excess dollars spent also compromise worker and community safety. Without additional flexibility to manage the work force in a way that does not require employees whose skills are no longer necessary on the payroll, Kaiser-Hill will have increasing difficulty completing the desired scope of work given the limited funds available.

4. *Reforming of DOE Orders*

DOE has begun a massive effort to review the orders it has issued over the past several decades and to eliminate those that are unnecessary or irrelevant to current conditions. DOE intends, at the end of thin process to have only those requirements in place that describe the "necessary and sufficient" safety envelope for the work that is being done today at its defense facilities. Completing this massive task is time-consuming and costly, but without a tailored set of orders, sites like Rocky Flats are spending scarce dollars to comply with outdated requirements that do not reflect current operations and needs. The existing orders, written for operating facilities, need to be transformed into appropriate guidance for a facility whose sole mission is closure and decommissioning. Congress should encourage the DOE to finish this effort by providing sufficient targeted funding.

5. Privatizing

Last year, several legislative proposals were introduced in Congress that would each have encouraged privatizing of large construction projects with associated limited time operations, such as a vitrification plant at Hanford. Although none of these bills has yet become law, at Rocky Flats there are several scenarios where privatizing could prove more efficient than current funding approaches. One would be to allow the privatization of a contract to build and run the plutonium storage vault on the site. While DOE has yet to decide if it will build a new vault to store the plutonium instead of rehabilitating an existing building at Rocky Flats, if DOE does choose the vault, privatization could substantially reduce the Government's overall costs of such a project. On a larger scale, Congress could adopt legislation to allow an entire Rocky Flats closure project to be privatized. In either case, the Federal Government would have to guarantee funding for the project, without, however, making an immediate authorization and appropriation. On the basis of a guarantee, and accepting the risks of delivering a high-quality product, Kaiser-Hill or a separate corporation could go to the financial marketplace to raise the incremental additional costs for the project. The revenues derived from the long-term contract would be pledged for repaying the financing with interest.

6. Reforming CERCLA

As mentioned above, DOE, EPA, and the State of Colorado are close to the release of a public-comment draft regulatory agreement to govern environmental remediation and much of the decommissioning work at Rocky Flats. Although Kaiser-Hill believes that the agreement will be a substantial improvement over the previous agreement signed in 1991, the complexity of the regulatory structure even under the new proposed agreement suggests that additional legal reform is necessary. One of the most contentious issues during the cleanup negotiation involved the overlapping jurisdiction of the EPA under Superfund and the state under its hazardous waste law.

- Allow for a single regulator at Federal facilities, for example by clarifying that EPA may delegate its CERCLA authority to an appropriate State agency so that DOE would only have to work with the State as its environmental regulator.
- Require that the regulatory agencies allow a Federal facility to use a single process, i.e., by choosing to use either CERCLA or a State's hazardous waste law, but not both, to obtain approval of work during a closure project like that which is proposed for Rocky Flats.
- Protect contractors at DOE closure projects as response action contractors (whose liability is limited in comparison with potentially responsible parties) even if they are also permittees along with DOE for the limited ongoing active air and water treatment or hazardous materials operations that must continue during the life of the closure project.
- Create a provision that would not only allow, but encourage, the regulatory agencies to combine their oversight of all environmental activities into a single agreement for DOE closure projects.
- Focus on risk reduction through source (i.e., contaminant) removal, and allow for incremental cleanups so that although DOE does not have the technology to clean up to background levels of contaminants cost effectively, or within its Federal budget appropriation, DOE is not prevented from doing any cleanup at its site and reducing risk to the maximum extent possible using the funds and technologies available.

In summary, our recommendations include:

- Make Rocky Flats a closure project
- Provide flexible, dedicated funding
- Make timely decisions on the national issues, such as plutonium and transuranic waste disposition
- Revisit the labor management requirements as they apply to closure projects
- Quickly complete the reconsideration of which DOE orders are necessary and sufficient for performing Rocky Flats' current mission
- Enable using private-sector capital for part or all of the project as appropriate
- Reform CERCLA to streamline the regulatory process and emphasize risk reduction

While any of these solutions alone would help Kaiser-Hill achieve what we were hired to do more quickly and efficiently, without compromising safety, this package of reforms would, I believe, truly reinvent the system in which we work in a way that will enable us to succeed. If we succeed, then DOE will succeed and Congress will be able to redirect future funds to traditional defense mission activities rather than to a delayed cleanup.

I would be happy to answer questions that you, Mr. Chairman, or the other members have. I thank you again for this opportunity to share my thoughts with you.

[Attachments A through E follow:]

Attachment A

KAISER•HILL
COMPANY

ICF KAISER

CH2MHILL

An Introduction to Kaiser-Hill Company, L.L.C.

Brought together to address the daunting environmental cleanup, waste management and plutonium risk reduction challenges posed by the Department of Energy's nuclear weapons complex, Kaiser-Hill Company, L.L.C., is a joint venture of two of the world's leading environmental and engineering firms—ICF Kaiser and CH2M HILL.

With 7,500 employees throughout the world, ICF Kaiser is one of the largest engineering, construction, and consulting services companies. The firm's partnership with DOE was forged at the Hanford Site in Washington state in 1952, when the Henry J. Kaiser Company began construction of a $120 million plutonium plant. Today, its services as the architect/engineering, construction, construction management, and base operations contractor at Hanford support DOE's multibillion-dollar, post-Cold War cleanup and economic conversion. ICF Kaiser's range of services has expanded over the years to respond to DOE's evolving national defense, energy, and environmental needs. Working at 39 of 40 DOE facilities, the company has executed projects that range from the design and construction of multimillion-dollar waste management facilities, to multi-site environmental audits and assessments, to the implementation of remedial actions.

> *"With the largest inventory of unencapsulated plutonium-bearing material in the nation, Rocky Flats is one of the most intricate sites in the Department of Energy complex. Some nights I lose sleep worrying about the possibility of an incident involving our plutonium."*
>
> *— Mark N. Silverman, Manager, U.S. Department of Energy Rocky Flats Environmental Technology Site, February 1996*

CH2M HILL brings 50 years of environmental experience to bear on the challenges of cleanup at a former nuclear weapons site, defense installations and commercial facilities. CH2M HILL is the nation's largest environmental engineering firm, with a record of performance integrating large, multi-disciplinary projects. The billion-dollar-revenue firm provides consulting, design, construction, operating and systems integration services through 7,500 employees, spanning some 120 offices worldwide.

Kaiser-Hill was awarded the integrating management contract for the Rocky Flats Environmental Technology Site in Golden, Colorado, in April 1995 and assumed operations of the 6,500-acre site July 1, 1995. Located less than 15 miles from downtown Denver, Rocky Flats has more than 14 U.S. tons of plutonium — more than any other DOE manufacturing facility. Nearly 40 years of nuclear weapons production at Rocky Flats left behind a legacy of radioactive waste and environmental contamination. Current waste inventories include 50,000 containers of transuranic and low-level radioactive wastes. These wastes will remain radioactive for tens of thousands of years. The amount of waste is expected to soar in the future during cleanup and decommissioning. Rocky Flats has approximately 170 individual areas of contamination, some of which pose a potential threat to surface and groundwater. While emergency mitigative measures have been completed, the site is located upstream of the water supply for 400,000 people. With no future weapons production mission, the goal is to clean up the site and decontaminate the facilities at Rocky Flats.

To address these challenges, Kaiser-Hill assembled a team of best-in-class companies — each with expertise in a specific area of operations at the site. The Kaiser-Hill Team's scope of work includes special nuclear materials management, waste management, environmental restoration, environmental monitoring, safety and quality systems management, community outreach, economic conversion, and site operations. In addition to Kaiser-Hill, team members include the following four major contractors and numerous subcontractors.

Safe Sites of Colorado — a combining of Westinghouse, a pioneer in DOE nuclear safety, and Babcock & Wilcox, the largest commercial producer of highly enriched uranium fuels.

Rocky Mountain Remediation Services — a joint effort of Morrison Knudsen, with an outstanding record for achieving cost-effective environmental restoration, and British Nuclear Fuels Limited (BNFL), an international leader in cost-effective nuclear waste management.

DynCorp Inc. — a company that manages successful site support operations at 45 federal facilities.

Wackenhut Services, Inc. — a top-performing commercial and government security services contractor with 30 years of DOE experience.

Kaiser-Hill's contract at the Rocky Flats Environmental Technology Site is one of the first contracts awarded under the DOE's contract reform initiative. Under the contract structure, Kaiser-Hill is the management integrator assigning and integrating tasks among its subcontractors. The contract, valued at $3.5 billion over five years, represents a benchmark for performance-based contracting. Under the performance-based contract, 85 percent of the company's fee is based on meeting specific goals, called Performance Measures, agreed upon with DOE. Under the Kaiser-Hill contract, employees are sharing in performance earnings for the first time in more than 20 years; 20 percent of the company's performance fee is passed on to its employees. All subcontracts to Kaiser-Hill are also performance-based. Kaiser-Hill takes a project approach to Rocky Flats and views each task as a project with a beginning and an end.

Key accomplishments under the integrating management contract at Rocky Flats include development of a new Rocky Flats Cleanup Agreement; consolidation of 16 cleanup areas into two at a potential cost savings of greater than $5 million; successful remediation of a former chemical dump site, Ryan's Pit, and the first-ever onsite treatment of environmental restoration waste at Rocky Flats using a low-temperature process; excavation of several hazardous contamination hot spots; venting of more than 2,500 residue drums to prevent potential problems associated with plutonium buildup; draining of seven tanks containing plutonium nitrate solutions; stabilization of plutonium solutions through cementation; brushing and repackaging of plutonium items with potential fire concerns; and the repackaging of plutonium items in contact with plastic.

Kaiser-Hill is a partner in the cleanup of Rocky Flats — a partner with the DOE, the employees of Rocky Flats, the Environmental Protection Agency, the Colorado Department of Public Health and Environment, local elected officials and the Rocky Flats community.

> *"Today, however, I am very optimistic about our ability to make real progress in cleaning up Rocky Flats and making it safe. Kaiser-Hill, our new integrated management contractor, has brought best-in-class services and the world's leading experts to bear on our difficult challenges.*
>
> *In fact, more real work was accomplished during Kaiser-Hill's first six months at Rocky Flats than was accomplished during the last five years. Kaiser-Hill has demonstrated significant initiative and innovation in developing bold alternatives for the accelerated risk reduction and closure of Rocky Flats. We are truly paying for progress."*
>
> *— Mark N. Silverman, Manager, U.S. Department of Energy*
> *Rocky Flats Environmental Technology Site, February 1996*

The Rocky Flats Closure Project

Summary

The Rocky Flats Closure Project proposed by Kaiser-Hill would radically accelerate the reduction of site risks and accomplish site closure, with final costs reduced significantly over current plan. Within 9 years and for less than $7 billion, waste and plutonium would be safely stabilized and placed in consolidated long-term storage. The site would be cleaned up to levels that would allow eventual unrestricted, open space, and industrial uses. The only remaining buildings on-site, other than those for commercial reuse, would be new facilities for plutonium, transuranic (TRU) waste and low-level waste. This interim on-site storage condition would require less than $50 million per year in operation costs compared with a current site budget of $700 million.

A second phase of the project would remove plutonium and TRU waste to off-site repositories and demolish the on-site storage facilities for a total additional cost of approximately $1.5 billion. The schedule for this second phase is dependent on the availability of repositories or other disposition solutions. If repositories become available in the next several years, this second phase could be completed simultaneously with the first phase. The annual operating cost of the site at the end of this second phase would be $5 to $10 million per year, depending on the waste storage configuration. With the exception of less than 200 acres that would be safely capped, all land would reusable by the public.

A third phase could be the cleanup of 1,500 acres of the site to residential, rather than to commercial and open space standards, and removal of low-level waste. This final cleanup could cost many billions of dollars. While this end state is important to some stakeholders, from a technical perspective, it provides negligible additional risk reduction as long as the site remains in an open space or commercial land use configuration.

The key variable to all costs is time. As annual funding is reduced, the cost and time required to complete the project increases dramatically due to high baseline operations and maintenance costs and inflation. When funding is reduced to near the current baseline cost of $400 million per year, it becomes impossible to predict if closure ever can be achieved without reducing the scope of the closure to a mothball type of alternative.

The project has been developed in conjunction with the development of a site vision and the negotiation of the draft Rocky Flats Cleanup Agreement with the U.S. Environmental Protection Agency (EPA) and the State of Colorado. While not yet approved by the regulators or the Department of Energy (DOE), it is supported by, and consistent with, the details of the draft objectives for the site contained in the preamble of the draft Cleanup Agreement.

Project Origins

When Kaiser-Hill was awarded the contract in April 1995, there was a strong call for action and vision at the site. The official closure cost in the DOE Baseline Environmental Management Report (BEMR) was $22.5 billion, and the cleanup would not be completed until the year 2065. The unofficial cost recognized by the site's submittal to the BEMR was $35 billion by the year 2080. With these long timeframes, the site was caught between the need to maintain and upgrade the buildings to last most of another century versus accomplishing risk reduction. DOE and the Defense Nuclear Facilities Safety Board (DNFSB) noted the dangers and diseconomies of this approach, and the stakeholders were impatient as little cleanup had been accomplished in the five years since production ceased.

To respond to these concerns, Kaiser-Hill set about to radically redesign the approach to site closure. Taking advantage of the experience of ICF Kaiser and CH2M HILL in site cleanup, a perspective on a new regulatory model for cleanup, EPA's Brownfield Initiative and ideas expressed by DOE, we designed a process that could be implemented within a decade at less than half the previously estimated cost. Since July, we have evaluated a full spectrum of alternatives for site closure. We have confirmed a $6.7-billion cost and a 9-year schedule. Stakeholder concerns expressed from the initial planning efforts could be substantially resolved for less than a 10% increase in the initial project cost and have been included in this $6.7-billion estimate. This evaluation also demonstrated the financial infeasibility of a closure to residential standards (much more than $20 billion). It also concludes that leaving the buildings standing in various states of deactivation (mothball alternatives) could be accomplished for a total closure project cost in the $3 billion to $5 billion range. However, this would require long-term annual operations and maintenance costs in the $50-million to $150-million range, and tens of kilograms of widely dispersed plutonium contamination would be left in place in the buildings, posing a long-term hazard to the community.

Background and the Existing Site

Rocky Flats is located 15 miles upwind of downtown Denver, Colorado and within a 50-mile radius of 2.2 million people. It is also upgradient of the water supply for 400,000 of those people. While the water supply issue has been somewhat mitigated by a bypass system for the site runoff, the site still has more than 14 tons of plutonium—the largest quantity of unfinished product in the United States. Three tons of the plutonium is in the form of manufacturing residues contained in more than 7,000 drums. The public is concerned about the site's two major historical process fires which spread plutonium contamination downwind toward Denver, that about half of the residues are in highly dispersible ash form, and that the DNFSB has labeled two of Rocky Flats' seven plutonium and uranium processing buildings as the most dangerous in America. A significant risk to the workers is the presence of 30,000 liters of plutonium/acid solutions that pose a criticality hazard, since many of the tanks containing the solutions have not been internally inspected in several years.

The site has been the center of controversy for many years, first as a target for anti-nuclear weapons protests and later as a result of its listing on the Superfund National Priorities List and its having been raided by the FBI for environmental crimes.

Rocky Flats opened in 1951 and, until 1990, manufactured plutonium, uranium, and stainless steel nuclear weapons components. It has 500 facilities to support refining, alloying, forging, machining, testing, and materials recovery operations. The recovery operations included incineration and a variety of chemical reprocessing unit processes. Additionally, the machining operation consumed large quantities of organic lubricants and solvents. The site currently occupies 6,500 acres, of which 300 acres comprise the main plant area. It contains 167 sites of known contamination (Individual Hazardous Substance Sites - IHSS) and currently has more than 50,000 containers of TRU, low-level and hazardous waste in inventory. The buildings, which comprise more than 6,000,000 square feet, contain miles of contaminated piping, hundreds of glove boxes, tanks and other process equipment.

Project Description

As described above, the project is envisioned to be executed in three phases. Phase I is the key closure and risk reduction phase and could be accomplished by 2005 for less than $7 billion. Phase II is a shipment and further closure phase where all TRU waste and plutonium would be shipped off-site and the two interim storage facilities demolished. This could be accomplished for about $1.5 billion and would take two to three years to accomplish after a repository is available. This is anticipated to end between 2005 and 2017. Phase III would include any additional cleanup that was desired at the time. This could include removal of stored low-level waste and further cleanup of the central 1,500 acres of the site that would have been closed to open space and commercial use standards in Phase I. This could cost many billions of dollars and take many years to complete.

Phase I — Near Term

Phase I, which would end from 2005 to 2020 or beyond, depending on annual funding, includes the following activities:

Plutonium Stabilization, Consolidation and Storage Activities

- Construct a new, interim plutonium storage facility to current safety standards.

- 6,600 kilograms of plutonium metal and 3,200 kilograms of plutonium compounds would be stabilized, packaged for long-term storage, and stored in the new interim plutonium storage facility awaiting off-site shipment.

- 3,100 kilograms of plutonium contained within 100,000 kilograms of residue materials resulting from past production activities would be stabilized, repackaged and stored for eventual shipment as TRU waste to DOE's Waste Isolation Pilot Plant (WIPP).
- 6,700 kilograms of enriched uranium would be packaged and shipped off-site.

Facility Decommissioning Activities

- All of the site's 500 facilities (of which approximately 50 are radioactively contaminated with plutonium or uranium) would be demolished with the exception of the new plutonium, TRU waste and low-level radioactive waste storage facilities or any other facilities deemed to be commercially valuable.
- Waste materials from demolition activities would either be sent off-site for disposal (uncontaminated debris) or stored on-site (radioactive waste).

Waste Management Activities

- Construct a new, interim storage facility for the storage of an estimated 2,500 cubic meters of TRU waste.
- Ship most TRU waste to WIPP, starting in 1998, averaging 1,200 cubic meters shipped each year. (It is anticipated that shipment of TRU waste would not be completed until Phase II).
- Construct new, retrievable, monitored storage/disposal facilities for approximately 330,000 cubic meters of low-level radioactive wastes (including mixed) and then place all waste in these storage/disposal facilities.
- Ship, for off-site disposal, at least 2,400 cubic meters of low-level radioactive waste (including mixed) annually.
- Ship an estimated 11,000 cubic meters of hazardous waste off-site for disposal.

Environmental Cleanup Activities

- Achieve the following land uses (i.e., cleanup would allow these land uses):
    - Approximately 6,300 acres would support open space uses (5,000 acres to residential standards)
    - Approximately 100 acres would support future commercial industrial use
    - Approximately 100 acres would be closed landfills and capped areas
- Clean up 55 Individual Hazardous Substance Sites to reduce the source volatile organic contamination. As part of this cleanup, treat 135,000 cubic meters of soil.
- Control sources of contamination throughout the life of the project ensuring that State-mandated water quality standards are not exceeded.
- Construct final covers or caps which would be placed over contaminated soils that remain, contaminated building debris, old landfills, and the low-level radioactive waste retrievable and monitored storage/disposal facility to inhibit contaminant migration.
- Perform continuous environmental monitoring.

Phase II – Intermediate Term

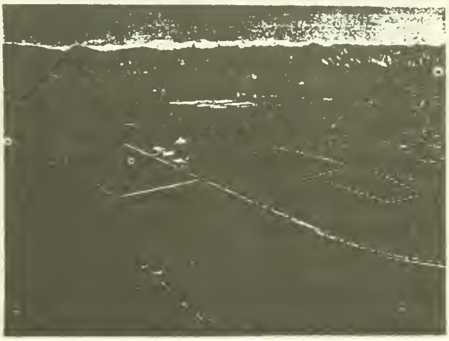
Phase II includes the removal of plutonium and TRU waste stored in Phase I and the demolition of the storage buildings. It would cost about $1.5 billion and take about four years (depending on annual funding) to complete from the opening of repositories. This is expected to be completed no later than 2017 but could be completed shortly after 2005. Low-level waste would remain stored on-site and environmental monitoring would continue.

Phase III – Final Condition

Phase III is dependent on the desire to fund additional activities at the time, since the site risk and hazard remaining would be very low as long as the land use continued to be open space or commercial. The work remaining to be accomplished to return the site to unrestricted residential use standards would be the removal of the stored low-level waste and the further cleanup of the 1,500 acres of land that had been cleaned up in Phase I to open space and commercial standards. With current technology, this would take much more than $10 billion and many decades to accomplish.

Evolution of the Rocky Flats Project

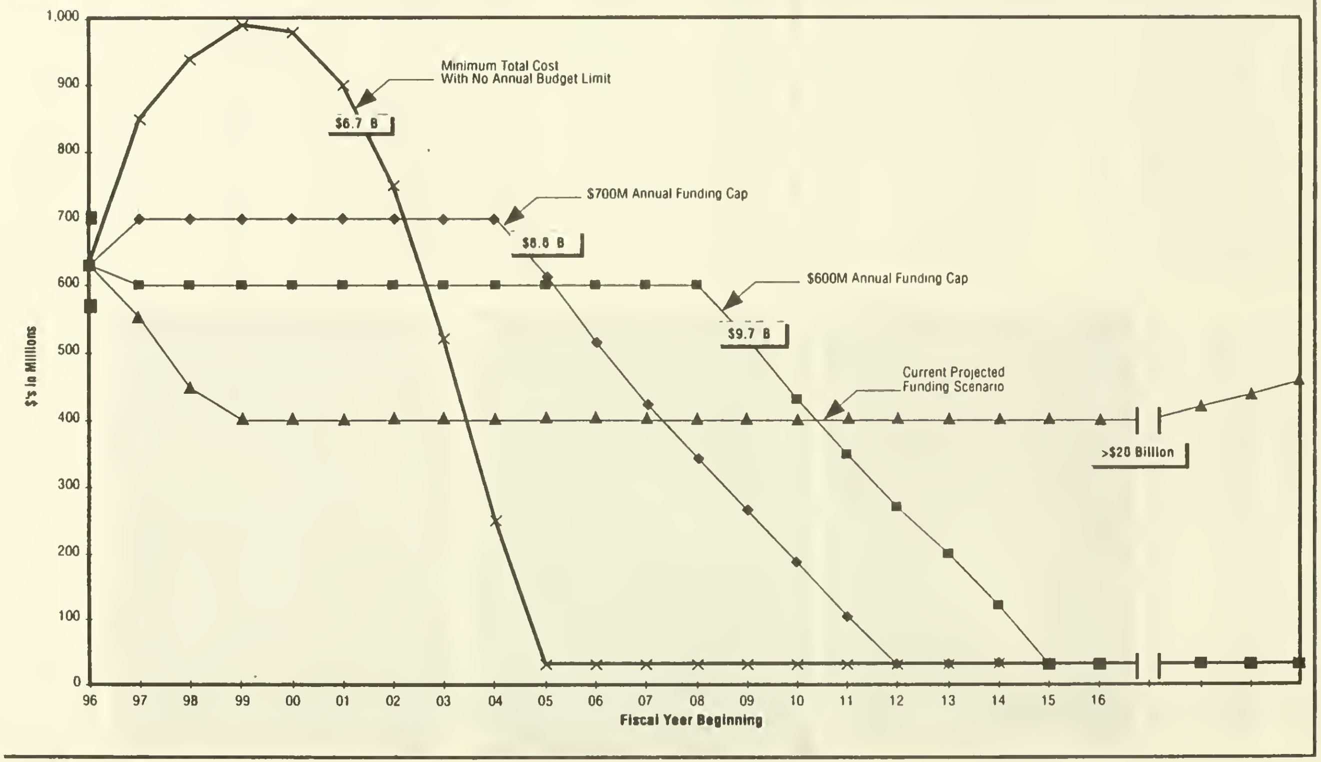
Current view of Rocky Flats showing many buildings and roads.



Rocky Flats in 2005 (completion of Phase I) showing only the 3 new storage buildings and outlines of 4 capped areas.

Rocky Flats in 2015 (completion of Phase II) with no buildings (a low-level waste facility may remain) and only outlines of capped areas. The final condition (Phase III), if funded, would remedy capped and nearby areas to residential standards, upgraded from the open space condition at the end of Phase II.

Attachment D
Interim (Phase I) Closure Project Funding Profile Comparison*



* Escalation and Delay Added

Biography of Robert G. Card

Mr. Card is the Executive Vice President and Deputy General Manager of Kaiser-Hill and is a member of CH2M HILL's Board of Directors. Kaiser-Hill, a joint company of ICF Kaiser and CH2M HILL, is the integrating management contractor responsible for the multi-billion-dollar operation and cleanup of the Department of Energy's Rocky Flats Environmental Technology Site.

Before joining Kaiser-Hill, Mr. Card was Executive Vice President and Group Executive for CH2M HILL's environmental business. During Mr. Card's more than 20 years with CH2M HILL, he led the company's development of its DOE business, which has involved work at more than 10 facilities. Under his leadership, the firm also became the largest contractor to the EPA and a major contractor to the Air Force, Army, Navy, and NASA–working at more than 100 installations worldwide. Mr. Card also has extensive private-sector experience. More than half of the revenue under his responsibility came from such major private-sector clients as DuPont, Chevron, Boeing, and Georgia Pacific.

Mr. Card also formed CH2M HILL's successful Environmental Strategy Group, which provides top management business consulting to the private sector and government to help them reduce or better leverage environmental expenditures to improve the return to shareholders and stakeholders. Typical assignments include developing cleanup strategies, enhancing environmental image or products, regulatory consulting, re-engineering the environmental function, analyzing decisions, identifying and resolving issues, and initiating waste minimization/pollution prevention measures.

CH2M HILL is a billion-dollar services firm that has been consistently ranked as the largest environmental engineering firm by the *Environmental Business Journal*.

Degrees or certifications held by Mr. Card include PMD, Harvard Business School; M.S., Environmental Engineering, Stanford University; B.S., Civil Engineering, University of Washington; and DOE Radiation Worker II.

Senator KEMPTHORNE. Mr. Card, thank you.

I will probably be directing the same question, and invite all of you to respond. But, before I do, I would like to just pick up on a few things that were mentioned in the opening comments.

Mr. Ofte, I believe you referenced about your citizen group that had worked so well together.

Mr. OFTE. Yes, sir.

Senator KEMPTHORNE. Which sounded like a real model that could be used not only for this issue, but a variety of issues.

And then, Mr. Card, when you just talked about, I do not know if it was upstream—it would probably be downstream—water users.

Mr. CARD. Yes.

Senator KEMPTHORNE. I know, Mr. Denson, you are familiar with that problem.

Mr. DENSON. Yes.

Senator KEMPTHORNE. Do you have a similar thing, as was described by Mr. Ofte, the use of citizens that are not simply those around the plant, but may be down-aquifer or downstream, and as you get farther away, where perhaps their jobs are not positively impacted by employment at the site, it is tougher and tougher to get the citizens to buy in?

Mr. CARD. I will take a shot at that first. I think generally it is true. Particularly, I would say the furthest downstream water users, who are nearly 15 air miles downstream of the site, are considerably more concerned about long-term waste storage on the site than I would say are the nearby users, who are more interested in getting the plutonium stabilized. They see it as a powder keg waiting to go off there.

However, I want to commend the regulators and the citizens. We heard the story of Fernald. We basically have achieved the same cleanup standards there for soil and groundwater. I think they have been very pragmatic in this approach, which is difficult for them, since they believe that the Government inflicted Rocky Flats on them, and they do not believe they derived any benefit from it.

Senator KEMPTHORNE. OK. Mr. Ofte, what was your experience with that? Did you have downstream users or other regions of the State that were included in the citizens group? Or how did you deal with those that were from a different region of the State and did not feel immediately positively impacted by your employment base?

Mr. OFTE. The task force started out by bringing a convener, and that was Dr. Ula Bingham from the University of Cincinnati staff, and with the thought in mind of getting a good cross-section. So one of the county commissioners for Hamilton County is on it, professors from Miami University, and the University of Cincinnati, local citizenry that live there, representation from townships in the area. Then, working with that group, in terms of providing information to them, up to and including a board game called Future Site, which forced the players, if you will, around the board game to consider tradeoffs, and recognize that there were no simple solutions to these problems.

Senator KEMPTHORNE. Was the winner always Nevada? [Laughter.]

Mr. OFTE. At any rate, as part of that, we also did surveys out in the community. What we found is that the people near the site understood the site and understood what our activities were. What we have also done, we have an envoy program. There are 75 employees at the plant that have volunteered, on their time, to be envoys to school boards, chambers, Rotaries, Kiwanis, commissions, and they go out there. In addition to taking the message out about what is happening at Fernald, they listen and bring back concerns.

And so if we detect a concern coming up somewhere, then we go and try to alleviate that.

Senator KEMPTHORNE. Good.

Mr. OFTE. But, by and large, if it is close to the plant site, the support is there. They understand it. When you get down into Cincinnati, then the perception is they do not really understand what is going on, but they view it as a problem.

Senator KEMPTHORNE. There may be some elements there that affect all of us and, again, not just on this issue. I can see it applied to some of the other environmental issues we are dealing with. But I think the more we can involve the citizens, so that they understand it and feel they are part of the decisionmaking, they become advocates.

Again, I remember at many meetings that if somebody read about it in the paper, then they would come to the hearing and they were offended. But if they were informed before the meeting and invited to be there, they were very responsive. It is just when anybody feels surprised, boy, they are tough to win back.

Now, if I could, I would like to just ask this of each of you, and in no particular order, just as you would like to respond. Perhaps we can just make it the 60-second rule, where we try to get some fast responses. But would you describe for me the greatest regulatory or bureaucratic impediment to a more cost-effective nuclear cleanup and waste management program? Some of you may have mentioned this, but if you could just really nail it and give us examples of these impediments from your own operations and how we can help. What would you ask of us to do to help you with your biggest headache out there?

Mr. Hall?

Mr. HALL. That is a tough one.

Senator KEMPTHORNE. To keep it to just one?

Mr. HALL. I suspect there is more than one.

Senator KEMPTHORNE. Yes.

Mr. HALL. Let me reiterate, though, that one of the barriers we have that is costing us a lot of money—us, the country—is the lack of reasonable de minimus release standards for low-level waste. Because we are, in fact, storing an enormous amount of material that is, by definition, being treated as low-level waste that, with a release standard, could probably be declassified as low-level waste and, as such, could go to sanitary landfills or other cheaper forms of storage and disposal.

That is an area that has the potential for reducing the enormous amount of material that we have stored—safely, let me add—and thereby reduce the surveillance and maintenance and storage mortgage that we are paying in this country that is substantial—and it is certainly large in Oak Ridge—by up to 50 percent.

Senator KEMPTHORNE. All right. I appreciate that. Good.

Mr. OFTE. I guess I would like to say amen to what Linc just said, because it is an important gap in our whole regulatory scheme so far, and that would be a good one to close. The other one I would add to that, though, and I think you have heard the refrain from several of us as we went across, is stability of funding.

Senator KEMPTHORNE. Yes.

Mr. OFTE. The ability to plan your work ahead, so that you can truly do things, like create a 10-year plan and then attack it, is so dreadfully dependent on being able to have some confidence that you are going to have stability of funding. I think one other that you also heard across here was being able to do things with contractors in an innovative sense—subcontractors now—to attract them to, by long-range commitments, to bring their own capital equipment in to take on part of the burden, and so that the Government does not have to go and lay that money out. But the contract vehicles are not there today, unless you get extremely creative.

Senator KEMPTHORNE. OK.

Mr. Schwallie.

Mr. SCHWALLIE. Just piggy-backing on that, I think two things: single regulatory authority at the State level would be very helpful, and Mr. Grumbly addressed that. Along goes with that a single interpretation of regulatory law. But another thing that would be very helpful, is we could go to the characterization of more generic type of sites, such that what was done at one site—perhaps in Idaho—could be applicable as a demonstrated cleanup technology at Savannah River, without having to go through another regulatory approval process.

So, looking at what has been approved by other regulators and having applicability at the local site and the transfer of that would be very helpful.

Senator KEMPTHORNE. OK. Good.

Mr. Denson.

Mr. DENSON. I think, Senator, that the Congress should re-look at all the environmental laws. There is SERA, RCRA, CERCLA, NEPA, and it just goes on. It is exponential, as a matter of fact, if you look at it on a time curve. Kind of integrate these things so that we can have this common interpretation that we are looking at. Because if you take a facility like Pit 9, which is processing the buried waste, it is CERCLA, if it processes the barrel waste, it has a RCRA program. It is the same facility to do the same, and it is handling the same type of waste, the same level of radioactive waste.

So those kind of things I think need to be looked at. It is fine to have the regulation, but get them to where they do not overlap, one agency is not pushing on you for another item. I think that would reduce a lot of cost.

Senator KEMPTHORNE. I might just add, too, Mr. Bill Ruckelshaus, who you are all familiar with, will be heading up an effort that is going to look at all environmental regulations, all of them, and will coordinate with the various think tanks, the environmental think tanks, the business think tanks, and just see if we cannot still accomplish what we want to on behalf of the environment, but do it smarter. Therefore, we can probably do it more efficiently with the dollars, and probably get better results.

And he has asked me to be part of that effort, which I look forward to. It would include this coordination. Realizing that there are so many of these environmental laws that you should not be in the situation that you—you finally feel that you have now complied with one set of regulations, and therefore you are done, only to find that there are a few other folks ready to talk with you now.

Mr. Card.

Mr. CARD. Well, I would support all of the things that you have heard. We want to go out of business in a hurry there. At least that is what we think our mission is. I think getting a consensus, a vertical consensus, from this body on down, of the tradeoffs between doing that and the labor-management approach—and by that I do not mean organized labor—we have a good relationship with the USWA, who is our largest union out there—but the overall labor-management approach. Is it more important to do that, or is more important to clean this site up? We would be willing to accept either mission. But there is quite a struggle now as to which one of those is operative.

Senator KEMPTHORNE. OK.

Mr. Moffitt.

Mr. MOFFITT. I guess it is easy to be last. I agree. The stability of funding I really believe is of major import to us to plan ahead.

Senator KEMPTHORNE. OK. All right. Good. The written statements from those of you indicate that an increase in the annual site budget would enable you to complete the cleanup of the hazards at those sites many years sooner at a much lower overall cost to the taxpayer. Could each of you briefly explain how the Congress might help you achieve such a breakthrough in reaching EM program objectives at your site?

Mr. Schwallie?

Mr. SCHWALLIE. I could start. A case in point that I think graphically shows the examples you are talking about is, for example, with our Defense Waste Processing Facility. At the funding we have for 1997, that certainly puts us on a path to meet our regulatory commitments. But just 10 percent incremental funding, in addition to what is targeted for 1997, for example, would allow that facility to be exploited and utilized more efficiencies, such that the tank cleanup could be accomplished about 15 years sooner, and at a life cycle savings of about $6 billion.

I think all of us could point out where we had small incremental funding—I am not talking about large amounts—that would exploit the capability we have. I would encourage us to take a life cycle view, a longer view, in terms of what the mortgage reduction could be in the long term.

There are other areas that are applicable in facilities that are being shut down that no longer have a mission, and get out of them, to where we can make them cold, dark and dry real fast. That is another way of saving money in the long term.

Senator KEMPTHORNE. Thank you.

Mr. Hall.

Mr. HALL. You heard Mr. Denson refer to helping us sustain some level of funding earlier. What I would like to comment on is that we clearly support doing more for less, and will continue to support that. We are learning how to do cleanup more effectively, using niche contractors who have specialties that will add more leverage to the DOE dollar. We want to continue to do that.

Senator KEMPTHORNE. Mr. Hall, could you hold 1 second?

Mr. HALL. Yes, sir. [Pause.]

Senator KEMPTHORNE. Mr. Hall, you brought tears to my eyes. Excuse me. I am ready to go again.

Mr. HALL. That is all right.

Senator KEMPTHORNE. That is the trouble when you are the only one manning the post here.

Mr. HALL. We all sympathize with that problem.

Senator KEMPTHORNE. Thank you.

Mr. HALL. The point I was making is that, within the spirit of doing more for less, I think you will find that many of us are all in what I would characterize as the hump years. We have been at this for a few years. We are learning how to do it. We have gone from study to getting the work done. We have an opportunity that is significant here, in the next 4 or 5 years, to reduce this mortgage.

And the thing that normally will happen with budget reductions is that the mortgage cost will essentially remain the same, because you have to stay compliant. So substantial progress can be made if we can reduce the mortgage. That means we need to hold some level of stability with the budget over the next 4 or 5 years.

Senator KEMPTHORNE. Let me ask you this. As I hear both of you reference this, that we can reduce the mortgage much sooner—and I have heard other say this—and Mr. Denson talked about incentives—that if we would allow flexibility, that 50 percent would be invested back into your project, but 50 percent could then come back to headquarters, as you described it, would it be an incentive to you if you are asked to make a commitment, that if we went this route, all of those funds would be reinvested toward the objective of reducing the time frame for the mortgage?

Now, I may not be saying that in the right vernacular, but I think you understand what I am saying. I mean, is that an incentive to you? Is that worth pursuing?

Mr. Schwallie?

Mr. SCHWALLIE. It definitely would be. It goes back and it is tied to the flexibility of the use of the money. People are basically incentivized to do a good job and are committed to do the best they can in a quality way. Those kinds of monies, given the discretion at the site to use them, to apply them to what they think has the highest priority in terms of reducing that mortgage, would be very, very effective. In some cases, those monies leave the site or people sometimes feel that if they save money it may not stay there. So that is a parochial view, but in the trenches of the organization, that is typically what happens.

So, to the degree that you could incentivize people to reapply their money on their biggest issues in the most rapid fashion, in a flexible way, that is definitely a gain.

Senator KEMPTHORNE. You see, as I listen to you, you make a compelling argument that if we could put incremental increases into your site budgets, the return on investment is amazing. It is in the billions of dollars. A few million here saving us billions down the road.

So that argument, all by itself, is pretty compelling; that we could at least make this argument. Then, if we also, to the extent we can, find incremental funding; but, in addition to that, if we could say, and we want to create this incentive program, which, again, will accelerate what we are trying to accomplish with this retirement of the mortgage sooner, perhaps the two wed together, we can make a pretty decent case. Then, as I look at Mr. Card's pictures there of Rocky Flats, and I look at all of those facilities, and then I look at the next picture, and I see what ultimately it will look like, if that does not serve as a motivation for people to want to see this happen.

So, again, many of these elements that we are discussing here, maybe we can begin to start weaving together. That is what we would hope for. Let me just, again, ask any others who would like to respond as to this discussion.

Mr. Card?

Mr. CARD. I am responding to your initial question of what would be the one, single thing.

Senator KEMPTHORNE. Yes.

Mr. CARD. I think, again, projectizing the site—and, by that, for this body, I would say, judging Rocky Flats and therefore Kaiser-Hill by its performance against a scope of work and overall project cost and schedule, so that we have a clear understanding of what we are all trying to achieve there, would be the greatest single thing that you could do for us.

Senator KEMPTHORNE. OK. All right.

Mr. Ofte.

Mr. OFTE. It was precisely that type of rationale that drove us a year ago to take a look at how could we do this thing sooner and more efficiently. That is what gave rise to the 10-year plan. We are blessed at our site, having only one-color money. So we have the flexibility that I think that John Denson aspires to. It really is extremely helpful to be able to move monies from where they are not needed to where they can accomplish the most.

But I think that you really nailed it, sir, when you talked about the bang for the buck that you get with incremental funding on top of what is already there to take care of today's program. Because that is where you really realize the greatest return on investment.

Senator KEMPTHORNE. OK.

Mr. Denson.

Mr. DENSON. I agree with incremental funding. In the life cycle costs, the time of investment is very critical. But if we make a commitment to incremental funding, it has got to be understood that it is multiple-year, like the funding curve you have there is a multiple-year funding curve that would have to be agreed to, or you will get into a mess with it. I do agree that incremental funding is the right way to do certain types of jobs, but that has to be a several-year commitment to Rocky Flats.

Senator KEMPTHORNE. OK, good. Anyone else on that? [No response.]

Then, too, you may have already said this, but I have got to catch on to some of these things. I hear you loud and clear on budget flexibility. Maybe this is something we leave to the budget people. But can you help define areas that we need to go that would allow you that flexibility? I would just as soon you design it instead of folks back here.

Yes, Mr. Ofte?

Mr. OFTE. Can I give you one example?

Senator KEMPTHORNE. Yes.

Mr. OFTE. One of our operational units, Operation 1, our waste pits, we have to exhume this material that accumulated over four decades and dry it, and then put it in gondola cars and send it out to Utah—8,000 gondola cars of material. Now, if we were going to, at the outset of this program, go to a situation where we would build our own dryer and bring our own excavation equipment and have the taxpayers fund that up-front money, that would require about $30 million this year and next.

We are trying now to devise an approach to go out to industry, to solicit their interest in coming in and bringing their own drying equipment, bringing their own excavation equipment, and not having to expend that budget authority on those capital investments now, and then provide ultimate reward to that contractor by giving him a unit fee for each gondola car he loads. It gets very hard, under the restrictions of the current procurement regulations, to do that.

And, among other things, we have to do now is to make sure there is enough funding to demobilize that contractor in case funding does not come through from whatever reason. So if you had that multi-year authority to go out and fully fund that entire exercise without wiping out the rest of your current-year budget, that would provide much more incentive for contractors to put themselves forward, to place themselves at risk, for them to make that capital investment at the front end, knowing that they were going to recoup their costs and earn their profit later with the unit cost.

So that is something we are involved in right now, trying to, within the current procurement regulations, see if we cannot construct a package to go out. But if those procurement regulations were changed to permit this type of innovation, then I think that would probably help all of us at this table.

Senator KEMPTHORNE. It would spread the incentives to others?

Mr. OFTE. Yes, sir.

Senator KEMPTHORNE. OK.

Mr. Schwallie, I think you had a comment.

Mr. SCHWALLIE. Well, multi-year budgets, if you cannot work on—Savannah River has its operating budget in 17 appropriation accounts and 25 line items—if we cannot break down the fences and make those more generalized, the other thing to work on is the level of authority that DOE has before coming back to Congress, in terms of making those decisions on their own, or notifying Congress, and if I do not hear something in a few days, we will go ahead.

So there is three basic ingredients on this funding flexibility thing that need to come together and can come together.

Senator KEMPTHORNE. OK, good.

Other thoughts on that?

Mr. Moffitt?

Mr. MOFFITT. Also, I think localizing the authority for being able to do those kinds of things that Ambrose is talking about, to send that kind of authority to the field office. Where that has been done, that has been very good. The K basins out at Hanford is a good example. That project is really moving forward rapidly. DOE has put the decision making authority in the local DOE office for the Fast-Flux Test Facility a number of years ago. They set up a separate project office on the local scene to make that project happen, and it really helped. Then things were able to move forward rapidly.

The more of that that happens, the better.

Senator KEMPTHORNE. Again, the concept is so sound. I know that all of you would welcome the opportunity. Knowing that with that opportunity goes the responsibility that you would come back next year and say exactly what you did, and you are proud of it. You gave us the opportunity, we went out and we performed. It is not as though we are going to turn the reins over and we will not see these good things happen. So I do think you have delivered a powerful message here today.

And I would hope, too, because I am familiar with many, many of the people that work at the Idaho National Engineering Laboratory—a wonderful work ethic, wonderful results, and I know that morale fluctuates because of the instability in these issues we are dealing with—so I would hope that your folks back home feel good that each of you were here today and presented really some very positive results from each of your sites, and with a good set of suggestions on how we can help you succeed back at these sites. Again, I would hope they would realize that and feel good about that.

The last thing I would ask you, for lack of anything more indepth, is just if anyone has a parting shot, if you were sitting here on this committee, and knowing what you know and probably wished that we knew, but what would you either incorporate or do that we perhaps have not touched on? Again, I may not have hit on the nerve out there. Is there anything else that you would like me to be thinking about as we consider this budget and ultimately go to the floor of the Senate and get passage of this budget?

Mr. Hall?

Mr. HALL. Very quickly, I will mention a subject that I am not sure we have touched on thus far, but do not want to overlook. That is the critical need for technology development as part of this equation to bring about this cleanup in the fastest, cheapest possible way. I would urge you to remain aware of that, and let us try to keep a perspective to support those research and development budgets that are tied to this EM cleanup mission.

Senator KEMPTHORNE. I agree totally. I agree.

Mr. Schwallie?

Mr. SCHWALLIE. I think the other thing you have heard is to pass this budget and perhaps enhance that budget. You have the credibility as a committee now to, I think, stand on, based on what you are hearing. This program has been very effective in the past few years, in getting its act together and doing the things involved in contract reform, all of the kinds of things that companies bring in to be innovative, creative and extract more out of people.

So you have tangible results to show people that things are happening out in the field in a very constructive, cost-effective way, with the highest regard for safety out there. That has been demonstrated by all these folks. I think it provides you the foundation to show leadership on how to go forward.

Senator KEMPTHORNE. That is right. Again, we will be summarizing and taking extracts from things that you have said, not only to demonstrate the tangible results, but the suggestions, and, again, of how we can accelerate the ultimate solution to a number of these things. So it will be very helpful.

Any other comments?

[No response.]

Senator KEMPTHORNE. Gentlemen, thank you very, very much. This has been very helpful for us, and I hope beneficial for you. Thank you.

Again, we will have questions that will be submitted probably on to you that we would ask still be made part of this record.

Senator KEMPTHORNE. With that, the hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

HANFORD PRIVATIZATION RFP

Senator THURMOND. What are the TPA milestones that drive the Tank Waste Remediation Program?

Mr. GRUMBLY. Below are listed the Hanford Federal Facility Agreement and Consent Order (TriParty Agreement or TPA) Major Milestones that drive the Tank Waste Remediation System (TWRS) Program. There are numerous sub-milestones which are called Interim and Target Milestones to the TPA Major Milestones. The Interim and Target TPA Milestones are used to demonstrate progress in meeting the TPA Major Milestones. Three TWRS TPA Major Milestones are currently under negotiation (noted on chart by *). In addition, a new TPA Major Milestone, that allows for an alternative path to TWRS privatization has been proposed. The changes associated with the proposed TWRS TPA Privatization Change package are currently undergoing public comment with approvals required by both the Department and the Washington State Department of Ecology and are expected to be implemented shortly. These major Milestones that are related to the TWRS Privatization effort are also indicated below.

TANK WASTE REMEDIATION SYSTEM—HANFORD FEDERAL FACILITY AGREEMENT AND CONSENT ORDER

[(Tri-Party Agreement) Major Milestones]

Milestone	Description
2/28/2000	Submit Part B Permit Applications or Closure Plans for all RCRA TSD Units.
9/30/99	Complete Identified Dangerous Waste Tank Corrective Actions.
9/30/2001	Mitigate/Resolve Tank Safety Issues for High Priority Watch List Tanks
9/30/2000	Complete Single-Shell Tank Interim Stabilization
6/30/2005	Complete Tank Farm Upgrades
9/30/99	Issue Tank Characterization Reports
9/30/2024	Complete Closure of All Single-Shell Tank Farms
9/30/annually	Double-Shell Tank Space Evaluation.
12/31/2028	Complete Pretreatment Processing of Hanford Tank Waste
12/31/2028	Complete Vitrification of Hanford High Level Tank Waste
12/31/2028	Complete Vitrification of Hanford Low Level Tank Waste

ENVIRONMENTAL IMPACT STATEMENT

Senator THURMOND. Mr. Grumbly, is an Environmental Impact Statement being prepared to analyze possible alternatives for remediation of the Hanford Tanks?

Mr. GRUMBLY. A draft Environmental Impact Statement for the Hanford Site Tank Waste Remediation System has been developed and issued, with the public comment period beginning on May 12, 1996. This environmental impact statement examines all reasonable alternatives for remediating the high-level waste in the Hanford tanks. The final Environmental Impact Statement is scheduled to be completed in July 1996, with a Record of Decision following in August 1996.

NATIONAL ENVIRONMENTAL POLICY ACT

Senator THURMOND. Mr. Grumbly, removal of the waste in the Hanford tanks with separation into high and low level treatment and stabilization for ultimate disposal is termed "ex situ with separation". Is this alternative being considered under the National Environmental Policy Act analysis?

Mr. GRUMBLY. The analysis conducted as part of the Environmental Impact Statement includes nine alternatives. Four of these alternatives involve varying degrees of separation of the high- and low-level waste fractions. Alternatives involving ex situ with separation include: Ex Situ Intermediate Separations; Ex Situ Extensive Separations; Ex Situ/In Situ Combination; and Phased Implementation.

REQUEST FOR PROPOSALS

Senator THURMOND. Mr. Grumbly, has a "Request for Proposals (RFP)" gone out to solicit bids to carry out the first phase of the "ex situ with separations" alternative?

Mr. GRUMBLY. Yes. The Hanford Request for Proposal went out on February 20, 1996.

Senator THURMOND. Mr. Grumbly, 40 CFR 1506.1 prohibits agency action on a proposal prior to issuance of a record of decision, if such action would limit the choice of reasonable alternatives. Can you describe how the issuance of the Hanford privatization RFP is in compliance with this section?

Mr. GRUMBLY. The issuance of the Request for Proposal (RFP) is an invitation by the Department to potential contractors for offers of proposals on work that the Department plans to undertake. The RFP does not commit the Department to any particular course of action and is not an agency action requiring review under the National Environmental Protection Act (NEPA). However, DOE is currently preparing an environmental impact statement that analyzes the Tank Waste Remediation System (TWRS) alternatives for management and disposal of tank wastes, including privatization alternatives. DOE will not undertake any actions before completing the EIS process that are prohibited under Council on Environmental Quality and DOE regulations implementing NEPA.

The RFP is structured into two parts—part A and part B. Part A is limited to the preparation of conceptual design and initial permitting activities. These activities would be permissible prior to the completion of the NEPA process under DOE's' NEPA regulations (10 CFR 1021.21 0(b)) and its order governing project management (DOE Order 4700.1). The Department's award of contracts for part A work would not obligate DOE to proceed with part B. DOE currently plans to complete its NEPA review prior to the award of contracts for part A; however, if delays because of public review prevent completion of the NEPA process before contract award for Part A, the Department would have ample time to complete the NEPA process prior to the completion of part A activities.

40 CFR 1506.1 allows for proposed actions to proceed as long as there is no adverse impact or the choice of reasonable alternatives is not limited. As discussed above, activities under part A of the RFP would be limited to actions that do not adversely impact the environment or limit the reasonable alternatives until the appropriate environmental documentation has been completed and a Record of Decision has been signed.

PRIVATIZED CONTRACT

Senator THURMOND. Mr. Grumbly, can you describe how DOE is planning to accumulate funds to make payments on the privatized contract? Please describe how the Anti-Deficiency Act is satisfied using DOE's planned method of payment.

Mr. GRUMBLY. Privatization of the Tank Waste Remediation System at Hanford is currently being funded out of the Defense Environmental Restoration and Waste Management Appropriation account. The President's fiscal year 1997 budget includes a new decision unit within the Defense Environmental Restoration and Waste Management Appropriation account, entitled Environmental Management Privatization. The intended purpose of accumulating privatization funding within this account is to allow the Department to reimburse contractors in the event that the Government incurs liabilities for termination of privatization contracts. Vendors have repeatedly indicated that they were unwilling to commit their capital on a competitive privatization without the Government providing this type of financial backstop. There is a small portion of the available funding that Will provide limited payments to the contractors for Phase I efforts. According to the Anti-Deficiency Act (31 U.S.C. 1341), it is unlawful for an officer or employee of the Government to create or authorize an obligation in excess of the funds available, or in advance of appropriations, unless otherwise authorized by law. Contracts for Tank Waste Remediation System privatization will be expressly conditioned concerning availability of funds. As privatized facilities are built, DOE will obligate appropriated funds in sufficient amount to cover the contractors' expenses with a nominal profit should the Government terminate the contract for its convenience. Outlays are not scored, however, until treated waste is provided to DOE once facilities are operational. This is expected to be at least 3 to 4 years after contract award. Annual appropriations and funds accumulated during vendor construction will be used to pay for treated waste. Since the Defense Environmental Restoration and Waste Management appropriation is a "no year" appropriation and the funds are available until they are expended, the privatization funds will carry over from fiscal year to fiscal year until they are fully expended. At no time will the Government be obligated for an amount greater than that which is available through Congressional appropriation.

REQUEST FOR PROPOSALS

Senator THURMOND. Grumbly, under the terms of the RFP will DOE be responsible for delivering waste to the remediation contractor in a form that meets contractor specifications?

Mr. GRUMBLY. The Request for Proposals defines feed specifications which will be incorporated into the negotiated contract. DOE is responsible to the vendors to deliver feed streams to the vendors tanks in compliance with these specifications.

Senator THURMOND. What pretreatment will be required to meet such specifications? Who will do it? What will it cost? Who will pay for it? What funds will be used?

Mr. GRUMBLY. Four feed streams will be provided to the vendors. The three low-activity waste streams require no pretreatment by the Government per se; however, retrieval and transfer to the vendor's feed tanks will be required. The high-level feed stream does require a pretreatment step prior to being delivered to the vendor for treatment. This pretreatment step consists of a water sludge wash. Washing, retrieval, and transfer of waste feed streams to the vendor's feed tank are to be performed by the Project Hanford Management Contractor for DOE. The costs associated with the actual washing and transfer of wastes by the Project Hanford Management Contractor are estimated to be $10 million annually beginning in fiscal year 2001. Funds are expected to be appropriated under the Defense Environmental Restoration and Waste Management appropriation account. The costs associated with work performed by the Project Hanford Management Contractor will be accounted and paid for separately from the privatization contractor.

FISCAL YEAR 1996 BUDGET IMPACTS

Senator THURMOND. The fiscal year 1996 Congressional Conference Report provided $5.557 billion in new budget authority for the DOE Environmental Management Program. This was considerably below the fiscal year 1996 budget request. You also were required to use $450 million more in carryover funds than were planned in the budget request.

a. How has this budget impacted the program's activities in fiscal year 1996?

Mr. GRUMBLY. The Department allocated the budget reductions according to the directions provided by Congress in the conference report. These directions were:

> Reduce headquarters costs. The headquarters budget is being reduced in fiscal year 1996 from a requested level of $349 million to $221 million—a reduction of 37 percent. This includes a 40 percent reduction in funding for headquarters support services contracts and a 20 percent reduction in funding for headquarters travel.
>
> Use prior year balances. Pursuant to Congressional direction, the Department is using prior year balances in fiscal year 1996 to the maximum extent possible.
>
> Accelerate cleanup activities. We have accelerated the cleanup programs at Fernald, Ohio and Rocky Flats, Colorado, which will save long-term costs.

Despite the cuts, EM intends to accomplish a great deal with the budget. The available funds will allow EM to make substantial progress on the ground to address priority risks. It is believed that with some relatively minor modifications of existing compliance agreements, EM will be able to fund virtually all of its legal obligations in fiscal year 1996. Spent fuel safety will be substantially improved. Safety upgrades to high level radioactive waste tanks will also be funded. The safety of plutonium on site will be substantially enhanced. EM will also make significant progress on dozens of cleanup projects.

Senator THURMOND. How has this impacted your fiscal year 1997 planning?

Mr. GRUMBLY. Declining budgets have forced the Office of Environmental Management (EM) to rethink how to accomplish the required work scope. The new EM strategy provides greater flexibility at the site level to direct resources to the activities that reduce threats to worker and public health and safety and imminent harm to the environment. The new strategy also explores non-traditional methods of competing and contracting major pieces of work scope, including privatization, to reduce the cost to the taxpayer. EM is developing a proposal for privatizing facility deactivation, which will authorize contractor financing of deactivation projects, with the contractor being paid from savings in maintenance costs to the government. This could greatly reduce the out-year maintenance mortgage for our facilities by enabling earlier facility deactivation than would be possible based on budgetary constraints. Site managers will engage the State governments, regulators, and public stakeholders in good faith negotiations to maximize risk reduction per dollar spent. This process of stakeholder involvement has taken place during the Formulation of the fiscal year 1997 budget request. Funding flexibility, new funding strategies, and better coordination of site priorities between the Department and local interests will help EM to accommodate the fiscal challenges.

QUESTION SUBMITTED BY SENATOR JOHN WARNER

Senator WARNER. Mr. Ofte, what commercial practices are you applying in the clean-up of the Fernald site? Are there any Federal, State or local regulations that you consider overly burdensome or inefficient that have adversely affected the clean-up effort?

Mr. OFTE. Fluor Daniel Fernald has adopted a "projectization" approach in order to successfully complete the Fernald cleanup. This approach has proven to be successful in the private sector and is undoubtedly the approach that we feel makes sense at Fernald. Projectization has led to an organization of project managers with greater empowerment and accountability. Projectization also allows us to perform multiple cleanup activities simultaneously and independently in a cost-effective and high-quality manner.

Fluor Daniel Fernald is comprised of a diverse team of focused companies with expertise in all required phases of the Fernald cleanup. All of these companies are client-focused, which is demonstrated by the fact that we have assisted the DOE in achieving a high degree of public consensus regarding our path forward.

QUESTIONS SUBMITTED BY SENATOR DIRK KEMPTHORNE

INEL

Senator KEMPTHORNE. The INEL has been designated as the lead lab for spent nuclear fuel and mixed waste treatment. The Lab also leads the DOE focus group on plutonium disposition. What if anything, have these designations meant to the site in terms of funding and program oversight?

Mr. GRUMBLY. For fiscal year 1996, INEL, as the lead laboratory for spent nuclear fuel management, received $5.3 million initial funding. With regard to program oversight and management activities, INEL:

- Led the development of a Technology Integration Plan to identify and prioritize Department-wide technology development needs for spent fuel storage and disposition
- Led the development of an Interim Storage Plan to identify, plan, and schedule the program integration activities necessary to support management of DOE-owned spent nuclear fuel
- Maintains a Master Logic Schedule of all Department-owned spent fuel management activities
- Is determining transportation requirements for spent fuel shipments to and from Department sites and ultimately to a repository
- Leads a working group in determining storage and transportation canister requirements

- Has taken the lead in implementing a quality assurance program for Department-owned spent fuel disposal activities under the direction of a Quality Assurance Program Manager assigned from the Idaho Operations Office
- Gathered spent fuel data from all Department sites into a database and performed on-site quality reviews of the source data.
- Participates in an Environmental Management and Office of Civilian Radioactive Waste Management joint working group to resolve issues related to acceptance of Department-owned spent nuclear fuel in a geologic repository

Additional funding of $2.0 million has just been allocated to the INEL Lead Laboratory to:

- Determine treatment, packaging, storage, and disposal options for the large number of different types of spent fuel stored at the INEL
- Conduct a Dry Cask Transfer System demonstration project in cooperation with the Office of Civilian Radioactive Waste Management and the Electric Power Research Institute
- Research a biological corrosion condition that occurs in aluminum-based fuels

For fiscal year 1997, a budget of $5.7 million has been requested to continue the above activities in assisting all DOE sites with disposal of their spent fuel.

The INEL was selected as the Lead Organization for the mixed waste focus area through a competitive process. Since February 1995, INEL has served as the lead organization for managing the administrative and technical elements of the technology development program for addressing mixed waste technology needs within Environmental Management. In this capacity, the INEL's programmatic functions include: managing the mixed waste technology development activities and demonstrations, coordinating with Field and Headquarters representatives in Formulating a national technology development program for mixed waste, and developing a technical baseline to provide the basis for recommendations on the appropriate mix of technology development activities, and associated funding, to address the technology needs for mixed waste. The fiscal year 1996 and 1997 budget for the INEL provides approximately $65 million for this activity.

The Plutonium Focus Area is a new program for fiscal year 1996. The Nuclear Materials Stabilization Task Group within the Office of Materials and Facilities Stabilization chartered the DOE Idaho Operations Office to assist in reviewing and directing the research and development required to apply technologies for stabilizing nuclear materials. In directing the Plutonium Focus Area, the Idaho Operations Office relies on support from Lockheed Martin Idaho Technologies and Argonne National Laboratory to provide systems engineering and project management for developing stabilization technologies. For fiscal year 1996, the Idaho Operations Office receives $2 million to find the Idaho Facilities for their support of the Plutonium Focus Area.

Mr. DENSON. Witness did not respond in time for printing. When received, answer will be retained in committee files.

ADVANCED MIXED WASTE TREATMENT FACILITY

Senator KEMPTHORNE. Can you tell me what the Advanced Mixed Waste Treatment Facility will do and how much it will cost?

Mr. GRUMBLY. The Advanced Mixed Waste Treatment Facility will retrieve, store, characterize, treat, and prepare the treated waste from INEL (Radioactive Waste Management Complex) for shipment to a disposal facility. Based on feasibility studies performed by the private sector, DOE estimates life cycle costs for these services to be $820 million.

Mr. DENSON. Witness did not respond in time for printing. When received, answer will be retained in committee files.

DOE ENVIRONMENTAL MANAGEMENT PROGRAM

Senator KEMPTHORNE. What is the optimum annual funding level for the DOE Environmental Management program such that the long-term investment required to meet all major program milestones would be minimized?

Mr. GRUMBLY. Although the precise level of total funding for the Environmental Management (EM) program necessary for optimal long-term efficiency is not yet certain, it is clear that substantial near-term funding cuts, below the President's budget request, could cause long-term inefficiencies. Ongoing investments are necessary not only for controlling risks, but also to stabilize facilities and consolidate nuclear materials. These investments result in reduced costs for maintenance and storage, thereby allowing more resources to be applied to cleanup. For example, instead of storing nuclear materials in several buildings at Hanford, the Department has consolidated storage, thereby obviating the need to fund safeguards and security in buildings that, although not yet decontaminated, are emptied of special nuclear and other hazardous materials, such as the PUREX facility. The Department has identified a number of such "mortgage reduction" opportunities, and is investing in these projects, and is continuing to identify more.

Analyses conducted for the 1996 Baseline Environmental Management Report provide some important insights. These analyses focused primarily on the implications of *lower* annual funding levels in the near term (fiscal year 1998 to fiscal year 2000) on long-term costs at the five sites that together comprise about 70 percent of the estimated total cost of the Environmental Management program: Hanford Site (Washington), Idaho National Engineering Laboratory (Idaho), Oak Ridge Reservation (Tennessee), Rocky Flats Environmental Technology Site (Colorado), and Savannah River Site (South Carolina). The projected base case life cycle costs for these five sites is approximately $160 billion over the next 75 years (until 2070). The "target" annual funding level for the EM program is expected to be approximately $5.5 billion in current dollars ($4.9 billion in constant 1996 dollars). Reducing annual funding to approximately $3.6 billion (in constant 1996 dollars) would nearly double the cost at these five sites to nearly $300 billion and stretch the duration another 100 years beyond 2070.

Given current fiscal realities, we have not explored the consequences of higher annual funding for the Environmental Management program in a systematic manner. However, increasing annual funding in order to accelerate certain activities such as vitrification of high-level waste, stabilization of special nuclear materials, and deactivation of contaminated buildings could reduce long-term costs by several billion dollars. This suggests annual finding higher than that assumed for the Base Case may reduce life-cycle costs, but additional analyses would be required to estimate an optimum annual funding level.

When annual funding levels are reduced, some Environmental Management activities must be delayed or stretched in time. This tends to increase life-cycle costs for three main reasons. First, it increases the number of years that nondiscretionary activities must be performed, including surveillance and monitoring of contaminated areas, surveillance and maintenance of facilities and storage of waste awaiting treatment or disposal. Second, buildings and storage facilities continue to decay, and contamination continues to spread in the environment, thus increasing the effort required to complete program milestones. Finally, a portion of Environmental Management costs go toward activities that are not directly related to direct mission activities but are essential to the safe and effective management of these activities. These so-called "support" activities include activities such as maintaining adequate safeguards and security, providing adequate worker protection, and providing landlord/infrastructure services. Delaying completion of the Environmental Management program increases the number of years for which support costs must be paid and thus increase life-cycle costs. Conversely, accelerating completion of direct mission activities (by increasing funding) should reduce the number of years of support costs and thus should decrease life-cycle costs.

UNCOSTED CARRYOVERS

Senator KEMPTHORNE. The fiscal year 1996 Congressional budget required you to use some $650 million in funding carried over from previous fiscal years during fiscal year 1996. What is the current status if uncosted balances and unobligated balances in the DOE EM program ? Has all of your carryover flexibility been "wrung out" of the program or will there still be significant carryover of previous year fund into fiscal year 1997? What is the target carryover balance for fiscal year 1996?

Mr. GRUMBLY. Oversight agencies, such as GAO, recommend, as benchmarks that carryover be limited to 8–12 percent for operating funds, 45 percent for capital equipment and 50 percent for construction projects. One of the primary reasons for the Environmental Management's (EM) uncosted balances is that our operating account includes many projects, particularly in Environmental Restoration, which execute similarly to construction projects, thereby causing larger operating carryover balances. Long procurement lead times for such projects contribute to the delay in costing EM funds.

However, the Department has made major reductions in the Environmental Management (EM) program uncosted and unobligated carryover balances in the last few years. Since fiscal year 1993, EM has reduced its uncosted balances from $2,471 million to approximately $1,564 million at the end of fiscal year 1995—a reduction of more than $900 million or 36 percent. Ending unobligated balances for fiscal year

1994 were $106.9 million and were reduced to $69.2 million at the end of fiscal year 1995.

EM originally proposed a $300 million offset to its fiscal year 1996 budget request through the "Use of Prior Year Balances." Based on final Congressional action, and due to the fact that carryover balances were much larger a year ago, the EM program was able to identify, deobligate, and return to the U.S. Treasury $314.4 million of prior year balances.

Fiscal year 1996 uncosted balances cannot be accurately determined until the end of the fiscal year. Nonetheless, based on cost trends through April 1996, we project carryover of approximately $1,676 million for all appropriations. This is a projected reduction of approximately $241 million, compared to fiscal year 1995 carryover of $1,917 million ($1,564 million EM plus $353 million Defense Programs weapons activities at Savannah River).

Of the $1,676 million projected fiscal year 1996 carryover, operating funds account for $1,025 million (13.9 percent of the available operating funds). This is a little above the established, operating benchmarks of 8–12 percent. However, as stated earlier, EM's operating account includes many projects, particularly in Environmental Restoration, which execute similarly to construction projects, thereby causing the larger operating carryover balances. Fiscal year 1996 construction and capital equipment carryover amounts are projected to be at 53.9 percent and 43.3 percent, respectively. These levels are acceptable relative to the established benchmarks for construction and, capital equipment carryover.

Considering the fact that fiscal year 1996 carryover levels are projected to be reasonably close to established benchmarks, we believe that the proposed use of $150.4 million of uncosted carryover as an offset to the fiscal year 1997 budget request is a prudent amount to offer. An increase to that offset would not come from prior year balances, but rather would result in a general reduction to new budget authority. EM believes that the current carryover levels are necessary and prudent for continuing operations and effective management of the program.

PROJECTED CARRYOVER BALANCE

Senator KEMPTHORNE. What is the minimum amount of projected carryover balance necessary for program operations and continuity?

Mr. GRUMBLY. Benchmarks have been suggested by oversight agencies which recommend carryover be limited to 8 percent for operating funds, 45 percent for capital equipment and 50 percent for construction projects. The 8 percent benchmark for operating dollars assumes carryover sufficient to maintain 1 month of operations. While a benchmark is useful to identify areas for additional analysis, programmatic differences within the Environmental Management program (EM) make the use of a standard benchmark ineffective. The Environmental Restoration Program receives its entire appropriation as operating funds, although the nature of the cleanup projects are not consistent with funding of typical operational activities. The EM Program provides funding to state and local governments, and Indian tribes which are managed by these entities and EM has no control over the spend-out rate associated with these funds, These and other factors must be considered on an individual basis to determine the right amount of uncosted balances carried forward for program operations and continuity.

EM has met the suggested benchmarks for capital equipment and construction projects. However, due to the programmatic issues mentioned above, the percent uncosted for operating funds exceeds the benchmark of 8 percent. As a result of recent discussions with the General Accounting Office, further analysis of operating expenses may be necessary to determine if an increase to the 12–15 percent range is more appropriate.

COST TO IMPLEMENT

Senator KEMPTHORNE. Mr. Grumbly, can you tell me the Department's current estimate of the cost to implement its portion of the agreement with the State of Idaho?

Mr. GRUMBLY. The Settlement Agreement with the State of Idaho identifies milestones the Department must meet from now to the year 2035, including compliance with the Federal Facilities Agreement/Compliance Order (FFA/CO), which is part of the agreement. The total cost of complying with the agreement this year and the next 6 years is estimated to be approximately $3.1 billion for the Environmental Management (EM) program.

Senator KEMPTHORNE. Also, could you describe to the members of the subcommittee the impact of a failure to meet the milestones contained in the agreement?

Mr. GRUMBLY. A range of penalties may be invoked depending on what milestones are not met. Penalties can include suspension of spent nuclear fuel shipments, fines and penalties under the Comprehensive Environmental Response, Compensation and Liability Act or Resource Conservation and Recovery Act, or other penalty actions levied by a Federal court. In addition, if the, Department fails to have all spent fuel removed from the State of Idaho by the year 2035, a fine of $60,000 per day can be assessed.

COST EFFECTIVENESS

Senator KEMPTHORNE. Mr. Grumbly, can you offer the subcommittee any legislative suggestions to improve the cost effectiveness of clean up and waste management activities in the DOE complex?

Mr. GRUMBLY. There are three areas where legislation would be useful in improving cost effectiveness of cleanup and waste management activities: (1) Superfund, (2) The Resource Conservation and Recovery Act (RCRA), and (3) privatization.

Superfund

A significant portion of the Environmental Management Program budget is driven by compliance agreements. The Superfund law is one of the principal legal drivers for these agreements. Addressing shortcomings in the law should facilitate the Department's effort to achieve greater results more cost-effectively.

Many of the desired improvements are already being addressed by the Environmental Protection Agency (EPA) through implementation of administrative reforms to the Superfund program. The Department is working with EPA to implement administrative reforms to the current program. These reforms are addressing a number of the more serious problems such as consideration of land use, ensuring that cost is properly considered and identifying a lead regulator.

Nonetheless, the Department continues to support revising the law to codify these reforms. Statutory change will ensure a framework that gets the job done in a manner that is both cost effective and protective of public health and safety. Some specific changes to the Superfund Law that are needed include:

First, the Superfund statute should codify the requirement that future land use must be considered in the remedy selection process. Future land use should be considered throughout the remedy selection process consistent with current EPA directives.

Second, better provisions for community involvement are needed. Superfund should be reformed to incorporate community involvement earlier in the remedy selection process. For too long, community groups have felt shut out of the process of site remediation decision-making, discussions of future land use options, and the risk evaluation process. Progress has been made, but community involvement should be mandated by statute to be an integral part of the remedy selection process that will, in the long run, make the risk assessment and the management process more open and more democratic.

A dramatic illustration of the value of citizen participation in land use and cleanup decisions can be seen at our Fernald site. After the Fernald Citizens Task Force examined and analyzed conditions at the site, they concluded that different parts of the site would be suitable for different future uses. As a result of the collaborative process with the site contractor, the Department, and the regulators, recommendations were made which will save time in completing the cleanup and an estimated $2 billion in costs over the life of the project. We need to have this type of process codified in Superfund. Besides demonstrating accountability and democratic principles, the Fernald case shows how citizen participation can be economical and a very "profitable" return on investment.

Third, to address the problem of overlapping State-Federal roles, the EPA Administrator should be authorized to delegate Superfund authorities to the states. The Department of Energy supports delegating to states certain authorities of the Administrator over cleanups of Federal facilities. In the interest of continuing to move forward, however, this delegation should not slow down on-going cleanups.

Implementation of administrative reforms together with statutory changes to Superfund can increase our program's effectiveness, and save taxpayer money. We cannot get to where we need to be without a team effort that includes regulators and Congress to address the systemic roots of our problems.

We have not, however, been simply waiting for legislative and/or administrative reform. We have sought in conjunction with our regulators and stakeholders to take full advantage of the flexibility inherent in the CERCLA decision process to address our concerns.

We have, for example, worked with our regulators to combine the requirements of the Resource Conservation and Recovery Act (RCRA) and CERCLA essentially under one cleanup program or approach to a site. The purpose of this effort is to provide a framework for implementing program priorities and to institutionalize a site-wide approach for remediation, resulting in little to no duplication of procedures or documentation. We have also identified, at some sites, a lead or single regulator for oversight purposes. At Hanford, for example, the proposed concept would eliminate the current support agency role in day-to-day oversight and decisionmaking. These efforts at streamlining the regulatory process as well as respective roles and responsibilities are aimed at making the cleanup process more efficient and cost-effective.

In another attempt to improve our regulatory performance, the Department instituted the concept of "workout" sessions at several DOE sites. These meetings have provided a forum for all involved to identify and address commitments and constraints or potential impediments to getting things done. They also have provided an opportunity to work collaboratively to develop a clear path forward in the current budgetary climate. These sessions reflect our focus on how we will mutually resolve the challenges that we face, while at the same time preserving the myriad roles and responsibilities we each have.

RCRA

RCRA has allowed the United States to make tremendous progress toward proper waste management and its implementation has minimized the creation of future Superfund sites. However, there is general agreement among the States, the Environmental Protection Agency and the regulated community, of which DOE is a part, that some reforms would be beneficial. In an effort to improve RCRA, last year the Environmental Protection Agency (EPA) convened a multi-stakeholder process, which included DOE, to obtain suggestions to improve the hazardous waste management system under RCRA. The government agencies involved in the Administration's multi-stakeholder process identified, and DOE supported, a number of possible areas of improvement to RCRA that would provide EPA with increased flexibility to tailor hazardous waste management requirements to the risk presented by particular wastes.

An example of the type of changes suggested by the Department at the public meetings held by EPA is modification of the corrective action provisions. The changes would facilitate the management of remediation wastes by making the applicable requirements more practical, effective, and cost-reasonable. At Senator Lott's request, EPA supplied technical comments on RCRA remediation waste legislation. EPA also engaged in discussions with States, industry, and environmental organizations on legislative proposals on RCRA remediation waste.

Another example of modifications suggested by the Department in the EPA-sponsored public meetings were changes to existing permit requirements to (1) promote the use of mobile treatment technologies for cleanup activities by allowing for multi-site use of such technologies (this would save the high costs of obtaining multiple permits for the same unit and be considerably more expeditious); and (2) allow for the issuance of a single class permit in cases where multiple treatment, storage, or disposal facilities of the same design will be built at the same or different sites. This would avoid redundant permits, necessary costs and delays.

At this time the Administration is not actively pursuing any changes to RCRA. Earlier in this Congress, the Administration did support legislation to change land disposal restrictions for certain RCRA wastes. That legislation has been enacted.

Privatization

The Department of Energy spends more than $600 million per year maintaining safety systems at our surplus Defense nuclear facilities to ensure that the public and its workers are protected against the radioactive and hazardous materials in these facilities. If the bulk of this material were removed, i.e., the facilities were "deactivated", the cost of maintaining these facilities could safely be reduced by 90 percent or more, potentially saving billions of dollars over the long term.

The Department is performing as much deactivation as can be afforded given our budgetary constraints. Legislation in this area could help to put private sector resources to work deactivating surplus facilities without increasing the Department's annual budget.

Senator KEMPTHORNE. Mr. Conway, can you suggest a more effective alternative to external regulation that will provide sufficient protection of human health and the environment while allowing DOE's program's to meet their goals cost effectively?

Mr. CONWAY. In 1988 Congress established the Defense Nuclear Facilities Safety Board as a safety oversight agency rather than as an external regulator of defense nuclear facilities. It did so after carefully considering and rejecting the more intrusive and costly regulatory approach. In lieu of full licensing or permitting of DOE facilities and activities, there are numerous regulatory-type tools available, ranging from approval of safety rules, Orders, and other standards proposed by DOE, to regulatory establishment of those standards, to enforcement authority. The Board does not believe full regulation or licensing is cost-effective. Rather, if additional regulatory powers are necessary, the Board believes that they should be granted or imposed in a step-wise manner, beginning with the least intrusive tools which are capable of adequately protecting public health and safety. In its recent Sixth Annual Report to Congress, the Board stated that it is currently assessing the necessity or desirability of obtaining the first- increment of regulatory authority along this continuum—a statutory requirement that the Board must approve DOE safety standards for defense nuclear facilities before they are finalized.

Senator KEMPTHORNE. Mr. Conway, what are your main problems with DOE compliance with Safety Board Recommendations? Can you proceed site by site if that is a sensible way to go? What needs to be done in each case?

Mr. CONWAY. Safety problems in many instances are site specific but in some cases are generic. The Board issues both site-specific and complex-wide safety recommendations as appropriate, depending upon the safety problems being addressed. For example, Recommendation 93–5, a site-specific recommendation, deals with characterization of radioactive waste in storage tanks at Hanford; in contrast, Recommendations 94–5 and 95–2 deal with DOE's standards-based safety management programs as they are implemented throughout the complex. When a Board recommendation is precise in its language, with clearly stated, achievable deliverables and associated milestones for their completion and is.compatible with DOE's missions and schedules, DOE is more likely to understand and respond favorably. When the problem addressed by a Board recommendation is generic, involving the entire defense nuclear complex or a combination of facilities and sites, or when the subject appears to be at odds with DOE's current priorities and schedules, the reaction is more likely to be resistant and to lead to considerable delay in its implementation.

After DOE acceptance and implementation of Board recommendations, safety improvements have been made in such fundamental areas as operational readiness reviews; compliance with safety standards, Orders and requirements at certain facilities; technical training at DOE sites; discipline of operations; the safe handling of nuclear materials; and radiation protection. However, the pace of progress has been slow, especially in increasing the number of qualified technical DOE personnel and in development of a sound, standards-based, complex-wide safety management program.

The Secretary of Energy has testified that the Board's actions, primarily in its formal recommendations, had assisted the Department in identifying and correcting public health and safety deficiencies at defense nuclear facilities. Key areas for which the Secretary was most appreciative of the Board's oversight included compliance with DOE safety requirements including Orders; hiring, retention, education, and training of DOE's technically-qualified personnel; readying facilities to operate safely; and conduct of operations.

Both the Board and DOE have learned much about improving the recommendation process during the past 6 years. Establishment of joint working groups early in the process contributes to satisfactory resolution of disagreements, and DOE's designation of a responsible senior manager to lead development and completion of acceptable implementation plans has greatly improved the earlier record. Not all the previous disagreements have been resolved, but some progress has been made, and the Board is confident that it can be sustained. The cooperation evident in the development of meaningful implementation plans for the most recent Board recommendations is a good omen, and with each such achievement, the climate improves further. Though some problems in actually completing implementation plans remain, these are, for the most part, amenable to correction by sustained attention of senior managers in both organizations.

ENVIRONMENTAL ASSESSMENT ON THE ELECTROMETALLURGICAL PROJECT

Senator KEMPTHORNE. Mr. Grumbly, the public comment phase of the environmental assessment on the electrometallurgical project at the Argonne National Laboratory is almost complete. Have you heard any argument that would prevent the Department from reaching a Finding of No Significant impact?

Mr. GRUMBLY. The public comment period for the *Environmental Assess7nentfor the Electrometallurgical Treatment Research and Demonstration Project in the Fuel Conditioning Facility at Argonne National Laboratory- West* closed on May 3, 1996. The Department of Energy received comments from approximately 95 individuals and organizations providing both positive and negative comments about the environmental assessment. The negative comments included several requesting the Department to prepare an environmental impact statement. After carefully evaluating all comments, the Department concluded that the environmental assessment supports a Finding of No Significant Impact (FONSI). The FONSI was issued on May 15, 1996.

PIT 9 PROJECT

Senator KEMPTHORNE. Mr. Grumbly, can you tell the subcommittee if the Pit 9 Project is behind schedule and over budget? If so, how much and why?

Mr. GRUMBLY. The Pit 9 project is currently not over budget but is experiencing some delays. Two enforceable milestones have been missed because of deficiencies in the design and remedial action workplan documents submitted to the regulators and this raises the possibility of fines and penalties. Design and some construction delays have put the project behind schedule.

Although there have been delays, significant progress has been made on the project. Construction is about 70 percent complete. Approximately 11,000 cubic yards of concrete and more than 1,500 tons of reinforcing rod have been placed and over 250 tons of structural steel have been erected. Procurement is approximately 90 percent complete and equipment fabrication is approximately 60 percent complete nearly all of this at off-site locations. Most of the equipment is now undergoing operational testing.

The Pit 9 Project is being conducted as a "privatized" contract. The design, construction, and operation of the facility is the full responsibility of the subcontractor. No cost increases have occurred to date and DOE is not liable for any associated cost increases that may occur in the future. A preliminary revised schedule has been presented by the Pit 9 contractor, Lockheed Environmental Systems and Technologies (LESAT). The revised schedule shows a 10 month overall delay in meeting the remaining project milestones. LESAT has reorganized its management and construction staffs, brought in more experienced team members, added resources to the project, and, in general, has improved the outlook for success.

Given the "first-of-a-kind" nature of this project as well as the enormous scope and technical complexity of the project, the delays experienced to date are not cause for major concern on the part of DOE. To date, neither EPA nor the State have notified the Idaho Operations Office in writing of intent to assess penalties for failure to submit a primary document pursuant to the appropriate deadline. No change orders for cost increases have been issued to date, and none are expected as a result of the delays encountered. The long term benefit of the success of the Pit 9 project in demonstrating privatization and the capabilities of existing technology to address mixed waste problems across the DOE complex far outweighs the current concern over schedule slippage.

Senator KEMPTHORNE. Mr. Grumbly, the recent draft Programmatic Environmental Impact Statement on surplus plutonium disposition considered several means of dealing with this surplus over the next 50 years. Can you tell me why the Integral Fast Reactor was not considered in this document?

Mr. GRUMBLY. The Department evaluated 37 plutonium disposition options as part of the screening process to determine reasonable alternatives for further evaluation in the Programmatic Environmental Impact Statement. The Integral Fast Reactor concept was evaluated as part of this process but eliminated from further consideration as not as reasonable as other technology alternatives due to its technical immaturity as well as the attendant costly and lengthy development and demonstration effort required to bring it to a viable, practical status which would enable a plutonium disposition mission to be initiated with certainty. Plutonium disposition can be accomplished using more mature or existing technologies, rather than developing this advanced technology for the purpose of plutonium disposition.

INEL

Senator KEMPTHORNE. Mr. Grumbly, in a recent meeting in my office we discussed a role for the Idaho National Laboratory in the management and oversight of the $50 million in science and technology activities provided by the Congress. I understand that INEL and DOE headquarters staff is unaware of any INEL role in the management of this program. Can you explain this situation to me?

Mr. GRUMBLY. Mr. Kempthorne, in the Department of Energy's May Financial Plan, $45 million of the Science and Technology funds were transferred to the Idaho Operations Office for management and oversight. My staff in Washington have been working with their INEL counterparts to insure that the program is managed in the best interest of the taxpayers. Both my staff and the INEL staff are aware of the INEL role.

DOE'S AGREEMENT WITH IDAHO

Senator KEMPTHORNE. Mr. Grumbly, what is the DOE doing to insure a permanent repository, an interim storage or WIPP is opening in time to meet milestones contained in the Department of Energy's agreement with the State of Idaho?

Mr. GRUMBLY. To fulfill part of the agreement the Department signed with Idaho, regulatory compliance efforts have been accelerated for opening the Waste Isolation Pilot Plant. This agreement calls for transuranic waste to be shipped from Idaho in 1999. Currently, the Department is on schedule to complete all prerequisites for opening the Waste Isolation Pilot Plant in April 1998. During fiscal year 1996 and early-fiscal year 1997, the Department will complete and submit the remaining regulatory compliance documents the Environmental Protection Agency. During fiscal year 1997, the Department will issue the Disposal Phase Supplemental Environmental Impact Statement Record of Decision. Early-fiscal year 1998, the Department expects the Environmental Protection Agency's certification of the Waste Isolation Pilot Plant and the Secretary of Energy decision to operate WIPP as a disposal facility. Two possible impediments to opening WIPP in 1998 exist: (1) potential litigation, and (2) the time, beyond 1 year after the Department has submitted the Compliance Certification Application to the Environmental Protection Agency, that it may take for the Agency's certification of the Waste Isolation Pilot Plant.

EFFECTIVE NUCLEAR CLEAN UP

Senator KEMPTHORNE. Would each of the witnesses please describe for the subcommittee the greatest regulatory or bureaucratic impediment to a more cost effective nuclear clean up and waste management program? Also, please give us examples of these impediments from your own operations and how the committee might help?

Mr. GRUMBLY. There is no single greatest "impediment," but a couple of issues can be highlighted here as priority issues to be resolved. First, we believe that certain changes to Superfund that are contained in the Administration's proposal are key to speeding cleanup and making it more cost-effective. Among these changes is the provision to allow the consideration of future land use in selecting a remedy. Instead of focussing merely on "how clean is clean", we need to ask the question, "clean for what?" We have made some progress using administrative reforms, but it is clear that resolution of this sticking point will require action by Congress.

Second, continued implementation of contract reform is vital to changing the incentives to reward performance, instead of activity. We have already made significant progress in making our contracts more performance-based. For example, the new contract at the Rocky Flats site has already improved results due to our basing most of the fee on specific performance measures. In addition, we have begun or proposed several privatized operations, including the cleanup of the high level waste tanks at Hanford, which is part of our fiscal year 1997 budget proposal.'

Senator KEMPTHORNE. Would each of the witnesses please describe for the subcommittee the greatest regulatory or bureaucratic impediment to a more cost effective nuclear clean up and waste management program? Also, please give us examples of these impediments from .your own operations and how the committee might help?

Mr. OFTE. The question of multiple regulatory jurisdiction and potentially duplicative requirements that must be followed while completing the Fernald cleanup constitute challenges. These requirements and regulations individually are not burdensome however, Fluor Daniel Fernald must meet multiple requirements simultaneously. For example, CERCLA and RCRA requirements as well as DOE orders (in some cases) can result in duplicative and unnecessary field work, reporting requirements, and overall costs without adding value to the cleanup effort.

We are seeking an agreement with DOE, Fluor Daniel Fernald and the Ohio Environmental Protection Agency to integrate and streamline remediation and closure requirements under two federal laws (RCRA and CERCLA). The pact retains the protective requirements of both laws while combining many of the duplicative administrative tasks and paperwork. This agreement will save at least $1 million over the life of the project. Congress can help us by continuing to identify, at a statutory level, other opportunities or flexibility to avoid duplication of effort, unnecessary administrative work, and apply cost savings that can be derived from these efforts to actual on-the-ground cleanup.

Senator KEMPTHORNE. The written statements from some of the site contractors indicate that a increases in the annual site budget would enable them to complete the clean up the hazards at those sites many years sooner at a much lower overall cost to the taxpayer. Can each of you explain how the Congress might help you achieve such a breakthrough in reaching EM program objectives at your site?

Mr. OFTE. DOE and Fluor Daniel Fernald have defined a viable accelerated cleanup plan at Fernald that will ultimately save taxpayers over $3 billion. Achieving this accelerated cleanup plan is contingent upon identified funding levels that we have already significantly reduced since the original plan accelerated cleanup plan was developed. Congress can help DOE and Fluor Daniel Fernald successfully complete the accelerated cleanup plan by supporting the identified funding levels on a consistent annual basis.

Senator KEMPTHORNE. Would each of the site representatives describe their fiscal year 1996 budget in the context of past budgets for your site and describe how it has impacted your program? Could you describe its impact on your major activities, objectives, and milestone schedules? How will this impact your fiscal year 1997 and outyear program planning?

Mr. OFTE. Under the accelerated cleanup plan, realistic schedule milestones have been developed and cost estimates have been established for each of the major projects. DOE and Fluor Daniel Fernald were able to continue to achieve success at Fernald in fiscal year 1996 despite the reduced funding levels. However, further reduction of Fernald's annual funding allocation in any given year will result in the inability of DOE and Fluor Daniel Fernald to complete the job according to the provisions of the accelerated cleanup plan. Reduced funding in the outyears will also result in an increased burden on taxpayers, which Fluor Daniel Fernald believes is unwarranted and should be avoided.

QUESTIONS SUBMITTED BY SENATOR J. JAMES EXON

MISSION PRIORITIES AT THE SAVANNAH RIVER SITE

Senator EXON. Mr. Schwallie, recently, the Department of Energy Savannah River Site has seen its emphasis change from nuclear material production to environmental management. Whether this shift is the correct one for our nation's national security needs is yet to be determined, and I am grateful to the Department for its continuing assessment of these needs and priorities. Mr. Schwallie, would you inform us as to:

a. What are the mission priorities at SRS that need to be protected, and why are these missions important?

b. What missions can or should be performed at SRS that are not presently performed there?

c. What can Congress and the Department of Energy do to provide stability for SRS?

Mr. SCHWALLIE. Witness did not respond in time for printing. When received, answer will be retained in committee files.

CLEANUP VS. STUDIES

Senator EXON. Mr. Grumbly, your testimony stresses the efforts made to stop studying and start cleanup. Can you tell us how much was spent on studies and how much on actual cleanup during fiscal year 1995? Can you also give us your best estimates of those amounts both for the current fiscal year and for your fiscal year 1997 budget request if it is fully funded?

Mr. GRUMBLY. We have made significant progress in shifting environmental restoration activities from assessment/studies to actual cleanup versus the phase. Over the past 2 years, our funding for direct cleanup has gone from under one half to over two thirds of the total environmental restoration budget. Funding for assessments has been cut in half during the same period. I would like to provide for the record funding information for cleanup versus assessment for fiscal years 1995, 1996, and 1997. Also, see the attached chart.

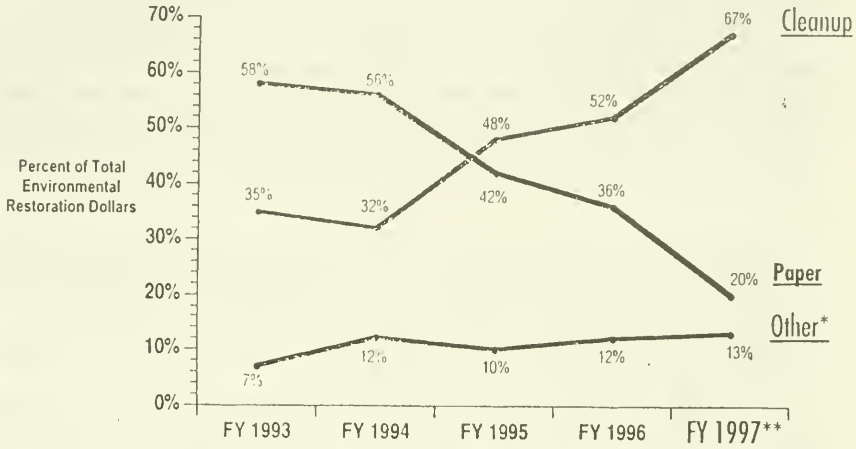
ASSESSMENT VS. CLEANUP

[$ in Thousands]

Environmental Restoration	FY 1995	FY 1996	FY 1997
Assessment	$741,909	$581,156	$307,745
Cleanup	849,761	835,921	1,036,667

Payoff More Cleanup, Less Paper

Environmental Restoration Funding



* Other - consists of program management, uranium reimbursement, landlord, surveillance and maintenance, etc.

** FY 1995, FY1996, FY 1997 percent comparison based on environmental restoration budget without Rocky Flats waste management and stabilization funds, and D&D contribution

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WESTINGHOUSE ROLE IN REPROCESSING OF COMMERCIAL FUEL AT SRP

Senator EXON. Mr. Schwallie, has the Westinghouse Savannah River Company been asked by DOE to examine the possibility of storing, stabilizing, and/or reprocessing spent fuel from United States commercial reactors at SRS? Can you describe for us what you were asked to examine, and what the results of your evaluation show?

Mr. SCHWALLIE. Witness did not respond in time for printing. When received, answer will be retained in committee files. .

QUESTIONS SUBMITTED BY SENATOR JOHN GLENN

SCHEDULE

Senator GLENN. Recently the GAO has reported that the characterization of the tank waste is far behind schedule. In fact according to the GAO: "After more that 10 years and about $260m invested in trying to characterize tank waste at Hanford, little definitive progress has occurred. . . all parties . . . need further assurance that the characterization programs has a sound technical foundation." GOA believes that not one of the 177 high level waste tanks has been accurately characterized, and that the uncertainties they identified could undermine the savings DOE expects to realize by privatizing the tank waste remediation program. Could you comment on this issue?

Mr. GRUMBLY. Of the 177 Hanford tanks approximately 134 (75 percent) have been fully or partly characterized to date, 12 have been completely characterized (7 percent); another 122 tanks have been partially characterized.

There is some uncertainty in all characterization data. The characterization data we are using as a basis for the proposal to privatize the tank waste remediation program is adequate to allow perspective vendors to estimate their costs for this program. None of the prospective vendors has questioned the adequacy of the characterization data. We believe that the level of uncertainty associated with the current characterization data will not undermine savings that we expect.

Senator GLENN. GAO recommends that the Secretary should defer funding the construction and pretreatment activities until technical foundation of established and sufficient waste data obtained. Comment?

Mr. GRUMBLY. We agree that funding for the construction of treatment facilities should be premised establishing the technical adequacy of the characterization program and ensuring that sufficient waste characterization information is available to define the requirements of those facilities. We disagree with the GAO conclusions that these conditions have not been met and that there is insufficient data to proceed with the tank waste treatment privatization effort. The effort is divided into two procurement phases. Phase I is a proof-of-privatization-concept/commercial demonstration scale effort which will treat between 6 and 13 percent of the waste over a 5- to 9-year period. The characterization data that we now have was adequate enough the prepare the Request for Proposal Phase I activities. None of the prospective vendors has questioned the adequacy of that characterization data. Phase II is a full-scale production phase and will treat the remainder of the waste. We will collect additional characterization data for Phase II as Phase II needs are defined.

SAVANNAH RIVER

Senator GLENN. In December Senator Levin and I wrote the Secretary urging her to close down one of the reprocessing canyons at Savannah River. The Secretary's response indicated that this situation was under consideration. The DNFSB has expressed some concerns about consolidating all processing in the F canyon, in that if facility is incapacitated, we have no back up.

If the canyons were consolidated, could the other canyon be placed in mothballs, so that it could be restarted on fairly short notice?

Mr. GRUMBLY. Yes. If the nuclear materials stabilization activities at the Savannah River Site were consolidated into F-Canyon, the Department would maintain the H-Canyon in its current state of readiness pending assessments of material stabilization progress in the F-Canyon and future mission decisions. Maintaining the H-Canyon in its current state of readiness requires continued maintenance, operator training and qualification, periodic reviews of Safety Analysis Reports, Bases for Interim Operation and other safety documentation and periodic exercising of critical process equipment to ensure that it is functional.

South Carolina officials and Savannah River Site contractors have proposed roles for the F and H-Canyons for disposition of highly enriched uranium and plutonium, plutonium recycling, and the management of foreign research reactor spent nuclear fuels. The Department is also considering some of these missions under several Environmental Impact Statements: the October, 1995 *Draft Environmental Impact Statement for the Disposition of highly Enriched Uranium;* the January 1996 draft *Storage and Disposition of Weapons—Usable Fissile Materials Programmatic Environmental Impact Statement,* the January, 1996 Draft Programmatic Environmental Impact Statement: Stockpile Stewardship and Management, and the February 1996 *Final Environmental Impact Statement on Proposed a Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel.* These decisions will be made within approximately 1 year from now.

If the canyons are consolidated and the progress of the nuclear material stabilization efforts in F-Canyon is satisfactory, and if no additional missions are assigned to the canyons, the Department expects to maintain H-Canyon in its current state of readiness until 2001 when all of the nuclear materials have been removed from the facility. No decisions have been made regarding the fate of the Canyons beyond that time.

Senator GLENN. How long would it take to restart the mothballed plant?

Mr. GRUMBLY. We estimate that it would take about 2 years to restart the H-Canyon facility from its current State. Restarting the facilities would entail hiring and training operators, inspecting and testing the processing equipment, upgrading the Safety Analysis Reports, Basis for Interim Operation and other safety documentation, and conducting an Operational Readiness review as required by the DOE Orders governing the restart of nuclear facilities.

Senator GLENN. How much money would we save, per year, by mothballing one canyon?

Mr. GRUMBLY. The Department of Energy and contractor staffs recommendation to consolidate was based on the savings identified in the Facility Utilization Report, which vary from year to year. Savings of 57 million were projected for fiscal year 1997, and savings of $19 million were projected for fiscal year 1998. Over a 10-year period, the total savings from consolidation were projected to be $168 million. The precise savings that would be realized in a consolidation strategy depend on the specific requirements for maintaining the readiness of H-Canyon, which are currently being developed, and the timing and impact of future decisions on H-Canyon readiness made as material stabilization progress and future mission decisions are made.

We are currently preparing a report to submit to the Defense Nuclear Facilities Safety Board (DNFSB) detailing the Department's proposal for the state of readiness to be maintained at H-Canyon. The report will propose to maintain the canyon in its current state of readiness, and will be submitted by October 1996.

Senator GLENN. How long would it take for the remaining canyon to work off the backlog, compared to the two combined plants?

Mr. GRUMBLY. We do not expect that there would be a significant difference in processing time between the consolidated canyon approach and the two canyon approach. The schedules shown in the Facility Utilization Report indicate that it would take approximately 8 months longer to work off the backlog using only the F-Canyon (completion by October 2000) than it would if we used both the F and H-Canyons (completion by February 2000). We believe this difference could be significantly reduced by accelerating some of the work and it is within the bounds of uncertainty of this baseline estimate.

The reason for the relatively small difference in the schedules is that the completion of the nuclear material stabilization at the Savannah River Site depends on the availability of several new facilities/capabilities rather than the processing capacities of the canyons. The completion date for stabilizing the nuclear materials in H-Canyon depends on the availability of facilities to stabilize and store the neptunium-237 which is used as target material to produce plutoniun-238. If the H-Canyon is used, the solutions would be converted to an oxide. If the stabilization is consolidated into F-Canyon, the neptunium and plutonium-239 solutions now in H-Canyon would be transported to the F-Canyon vitrification facility being built for the americium and curium solutions. This new facility is expected to be ready in 1998. In order to transport the solutions from H-Canyon to F-Canyon, a container must be developed and approved by the Department of Transportation. Furthermore, the neptunium cannot be solidified until adequately-shielded storage space is available. Unless another storage location can be found, the solidification of the neptunium must also await the completion and startup of the new actinide packaging and storage facility at the Savannah River Site. This facility is to be ready to accept neptunium in 2001.

Senator GLENN. You are responsible to cleanup and the mess that DOE has left over from the cold war. Much of that mess resulted from the attitude that cold be characterized as: "Pollution is OK, as long as we don't think it will go outside of the fence."

The environmental workers as well as the numerous members of the Public may be at risk from this attitude. We know that the radioactive plume at Hanford is going deeper and further than ever envisioned. That may be true at other sites as well.

Should the current "Site Boundary" be moved from the Reservation Boundary to the Facility Boundary to provide adequate protection for the Public, Workers, and the Environment within the boundaries for DOE sites ?

Mr. GRUMBLY. The site boundary should not be moved from its present location back to the facility or area boundaries. From a safety perspective, the site boundary is established as a buffer area for protection of the public. It is conservatively sited based on theoretical design basic accidents and in a practical sense, it is the area within which public access can be controlled. For example, a public road traversing a DOE site is considered to be within the DOE site boundary if, when necessary, DOE has the capability to control the road during accident or emergency conditions.

We believe it prudent to maintain the site boundaries as currently defined to support ongoing activities: At some sites, such as Hanford, a substantial portion of site land has been cleaned up (e.g. North Slope and Axid Lands Ecology Reserve) and could be released for other uses. However, future decisions of this nature should be based on a process similar to the which resulted in the Comprehensive Land Use Plan and specifically, the Hanford Remedial Action Environmental Impact Statement, which encourage public input in the decisionmaking process, before any decisions are made.

Senator GLENN. Last year's Report to Congress discussed several innovations you had developed to help monitor for underground leakage of radioactive materials, and to remove some of these materials from the soil.

Would you describe what progress you have made in those two areas, and how well the new devices are working?

Mr. GRUMBLY. We have made significant progress with our characterization and monitoring capabilities. For instance, in fiscal year 1996 we demonstrated that Electric Resistivity Tomography (ERT) detected leaks as small as 50 gallons at a mock facility at Hanford. We will install ERT at a Hanford tank farm in fiscal year 1997 to detect leakage of high-level radioactive waste from tanks during aste retrieval operations. Also, Cone penetrometer Truck (CPT) sensors have been developed to directly measure both radioactive contaminants plumes. CPT sensors and field instrumentation are integrated to provide on-the-spot data from the subsurface. Radioactive and hazardous contaminants in soil, soil vapor, and groundwater were analyzed in the field using this technique at several DOE sites this year for characterization programs.

Real progress has also been made on techniques to actually remove or facilities the removal of contaminants from the soil. Dig Face, a tool demonstrated during fiscal year 1995 and which characterizes the soils as the excavator digs, assures that only contaminated soil is removed, thereby reducing waste volumes significantly. We will use Dig Face this year at Sandia on an actual cleanup site. Another retrieval system is the Telerobotic retrieval system that is being demonstrated at Idaho National Engineering Laboratory's Pit 9. This system remotely retrieves buried was using various tools. We have also demonstrated a cryogenic cutting tool that uses freezing technology to solidify the waste before cutting and removing blocks of soil.

Senator GLENN. The Report by the Advisory Committee on External Regulation of DOE Nuclear Safety recommends establishing "External Regulation" for all safety at DOE Facilities. The Committee believes that this move would provide stability and balance in safety management and policy, remove redundant and confusing requirements, remove conflicts of interest for internal regulators, increase public awareness of and credibly for DOE's operations, and improve management accountability for safety. Would you care to comment on the Report and discuss how you see such a program affecting the cleanup work at DOE sites?

Mr. GRUMBLY. I would like to commend the Advisory Committee on External Regulation of DOE Nuclear Safety for its thoughtful and informative analysis of these very important and complex issues. Upon the request of the Secretary, I am currently chaining a working group of senior individuals within the Department of Energy, the Office of Management and Budget, and the Department of Justice to evaluate the Committee's recommendations. We will be happy to share our conclusions with you and other members of Congress when we have finished our evaluation.

Most of the environmental cleanup activities at DOE sites are already externally regulated by independent extenial agencies, such as the U.S. Environmental Protection Agency (EPA) and those States to whom EPA has delegated authority. In addition, the Defense Nuclear Facilities Safety Board performs important oversight functions at defense-related facilities. Therefore, a program focusing on external regulation for DOE nuclear safety would likely have only a marginal impact on on-going environmental restoration and waste management activities. Nonetheless, there are environmental areas that are still not externally regulated, such as radiological effluents to surface water, cleanup at non-Superfund sites, and low-level and cleanup waste disposal. Our working group's analysis is focusing on the most effective way to ensure safety at our facilities.

EXTERNAL REGULATION

Senator GLENN. Technically, you are not a regulator, but you do provide independent oversight for nuclear safety. What is your view of the need for independent oversight of the DOE in other areas, like chemical safety? Or the more mundane OSHA-type areas like hoisting and rigging, or confined space entry? Who should conduct this oversight?

Mr. CONWAY. As a major driver for the establishment of the Board, you were instrumental in providing for independent oversight of DOE's defense nuclear facilities as added assurance for the public that DOE would not abuse its self-regulatory authority over weapons production to the detriment of safety and environmental protection of workers and the public. DOE's self-regulatory role applies only to nuclear materials and this has been the principal, although not sole, focus of Board attention. The Board does look at the potential for nonnuclear processes and phenomena that could influence the safe processing and control of nuclear materials. For example, the buildup of noxious gases, the potential for explosions, acid and chlorine spills, fires, and lightening strikes.

As to the need for independent oversight of DOE in other areas, like chemical safety, the Board does not advocate either enlarging our existing charter or providing for separate independent oversight. Our reasons are several fold:

- Hazardous and toxic materials generated, treated, stored, and disposed are already subject to regulation by both Federal and State authorities under provisions of any number of environmental protection statutes: e.g., RCRA. Creation of additional regulatory or independent oversight entities would simply overlay existing independent regulation and hardly seems merited.

- As a principle, independent oversight in general should be invoked sparingly. To do otherwise is to provide a crutch at taxpayers expense for an agency capable of compliance with well-established, good safety practices, but unwilling to exercise the discipline to do so.

As to OSHA-type areas, the principal burden for providing safety at the workplace in the commercial industrial sector rests with the industry. While OSHA does much to define and enforce good workplace practices, the industry largely self-regulates. DOE has traditionally laid this responsibility largely on their operating contractors, and has overseen their compliance, and rightly so. Whether for credibility reasons or relief from having the responsibility to provide oversight of their contractors, DOE is seeking OSHA external oversight of their operations. Independent external oversight costs money. OSHA reportedly, already strapped for funds, cannot take on external oversight of DOE without additional funding. OSHA expertise is in industrial practices other than radiation safety.

If external oversight of nonradiological industrial safety practices is to be done, OSHA would be the logical agency to provide such function. The Board is not in the position to weigh the costs or benefits of such an assignment.

IMPLEMENTING YOUR RECOMMENDATIONS

Senator GLENN. DOE has accepted every Board recommendation but one, yet there is a significant gap in getting these implemented. How can your recommendations be given more teeth? Do you think this is necessary?

Mr. CONWAY. As of the date of our Sixth Annual Report, indeed all Board recommendations except our latest, Recommendation 95–2, were fully accepted by the DOE. Since then, the reservations that DOE had with respect to Recommendation 95–2, have been resolved to the mutual satisfaction of the Board and DOE and DOE has accepted the recommendation. An Implementation Plan for Recommendation 95–2 has been developed by DOE and accepted by the Board as a reasonable basis for proceeding.

The question of whether the Board should have greater action-forcing authority is one to which the Board has given much thought. As reported to Congress by the Board, both through our annual reports and occasions for oral briefings, the fulfillment by DOE of improvement programs in response to Board recommendations have frequently not kept pace with Board expectations or DOE commitments. The Board has been working this issue with the Secretary and her associates at the highest levels.

Both the Board and DOE have learned much about improving the recommendation process during the past 6 years. Establishment of joint working groups early in the development process for implementation plans contributes to satisfactory resolution of disagreements, and DOE's designation of a responsible senior manager to lead development and completion of acceptable implementation plans has greatly improved the earlier record. Not all the previous disagreements have been resolved, but some progress has been made, and the Board is confident that it can be sustained. The cooperation evident in the development of meaningful implementation plans for the most recent Board recommendations is a good omen, and with each such achievement, the climate improves further. Though some problems in actually completing implementation plans remain, these are, for the most part, amenable to correction by sustained attention of senior managers in both organizations.

PRIVATIZATION OF CLEANUP

Senator GLENN. The Board's, 5 year report recommends against requiring a license to operate DOE facilities (neither for those facilities currently operating, nor for those planned in the future). Increasingly now DOE is planning more aggressively to "privatize" cleanup—for example, the Hanford tank waste—primarily in order to get outside capital for cleanup. Such proposals would basically result in DOE paying for completed services, i.e. volume of waste pretreated or vitrified. DOE would establish waste acceptance criteria. The contractor would design, build and operate necessary facilities.

Who would regulate these facilities (vit plants, pretreatment plants, etc?) NRC? Board? DOE does not appear to be addressing this issue.

Mr. CONWAY. Regulation of any "privatized" DOE nuclear facilities must be considered in light of existing regulatory and oversight statutes. Several agencies currently share regulatory and oversight responsibility for cleanup of DOE's defense nuclear facilities. For example, cleanup activities at Hanford, which are referred to in the question, have been conducted pursuant to regulation by the United States Environmental Protection Agency (EPA) and by the State of Washington under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA), and the court-approved tripartite cleanup agreement with DOE. The Board also performs oversight of nuclear waste storage facilities at Hanford "under the control or jurisdiction of the Secretary of Energy." Moreover, it is anticipated that the final repository for commercial and defense nuclear waste, possibly at Yucca Mountain Nevada, will be licensed by the NRC pursuant to the Nuclear Waste Policy Act of 1982, as amended.

Assuming the Secretary of Energy "privatizes" certain waste storage and treatment facilities at Hanford, the Board by law would continue to exercise its oversight so long as the defense waste stored and processed at such a private facility remained "under the control or jurisdiction" of DOE. EPA and the State would also continue regulation of the overall cleanup and privatized facilities pursuant to CERCLA and RCRA. Transfer of the "control or jurisdiction" of defense material and/or wasted from DOE to NRC, other than to a licensed permanent repository provided for in the Nuclear Waste Policy Act of 1982, as amended, would appear to require a statutory amendment, although a full legal analysis has not yet been performed. However, a full answer to your question would require a detailed examination of privatization agreements as they are developed establishing the legal relationship between DOE and the private contractor.

QUESTIONS FOR DNFSB

Senator GLENN. Have you addressed the question of "Where is the real Site Boundary of DOE facilities?", particularly from the point of view that "Pollution is alright as long as we don't think that it will cross the reservation fence?"

Mr. CONWAY. This question is germane to Federal and State administration of a number of environmental, health and safety (ES&H) statutes, e.g., RCRA, Clean Air, Water Pollution Control, CERCLA and the AEA. It may also be a determinate factor in decisions affecting the eventual release of sites for public uses.

The Board is dealing with a number of aspects of this matter. They are as follows:

- The Board has urged DOE to give closer attention to the safety of collocated and neighboring workers who may be impacted by an accident at a facility although the off-site public may not be at risk. For example, in its letter to DOE dated December 18, 1995, the Board noted the proximity of the Savannah River Central Training Facility (CTF) to the Defense Waste Processing Facility (DWPF), the number of transient occupants expected to be using the training facility, and the short time for CTF respondents to receive notification and execute emergency procedures for shutting down the building's ventilation system. DOE has subsequently revised its notification procedures and provided additional emergency response training to CTF staff members to improve the situation.
- A number of sites currently have both active and inactive low-level radioactive waste burial grounds as such the Board has received DOE operational practices to ensure that personnel within site boundaries, in addition to the general public beyond the site boundaries, are adequately protected from emissions. Further, as being experienced at Fernald, dismantlement and cleanup will very likely result in quantities of low-level residuals that must be retained on site. The Board, by its Recommendation 94–2, has worked with DOE to establish a program for looking complex-wide at this issue.

Senator GLENN. Have you reviewed DOE's standards that make classification of facilities with the potential for "significant off-site consequences" as Category 1 (highest) Hazard Level *optional* instead of *mandatory* as provided for in the DOE Order?

Mr. CONWAY. For the past several months, the Board's staff has been actively engaged in a detailed review of all DOE Orders and standards involving nuclear safety at defense nuclear facilities. The Board and its staff have made a large number of suggestions to DOE regarding DOE's proposed elimination of many formerly mandatory elements of DOE Orders. Although many of those elements remain in place as guidance in DOE standards or other guidance, the Board has strongly urged DOE to reconsider several instances in which mandatory provision have been changed to optional.

The Board is unaware of any DOE proposal to make classification of facilities with the potential for "significant off-site consequences" as Category 1 (highest) Hazard Level optional instead of mandatory as provided in DOE Orders. The Board would not support such a proposal.

In this connection, Section II A (pages 6–11) of the Board's Sixth Annual Report sets forth in considerable detail the ongoing activities of the Board and its staff in the area of interest.

Senator GLENN. Have you reviewed the DOE Standards which place many DOE facilities, which, if they were in the private sector, would be regulated by the NRC, outside of the DOE "Self-Regulation" program?

Mr. CONWAY. As noted in my answer to the previous question, the Board has been actively reviewing in detail all DOE Orders and standards associated with nuclear safety at defense nuclear facilities. The NRC has a body of regulations, guidance, and standards that are applicable to commercially licensed facilities. The Board is well aware of these items and has been encouraging DOE to use many of them in DOE Orders and rules, as appropriate. The Board is unaware of any DOE Orders or standards which place any facilities outside DOE's "Self-Regulation."

As mentioned above, many DOE standards are technically similar to or the same as commercial standards while many other standards are unique to DOE's mission and have no counterparts in the private sector. For example, standards associated with assembly and disassembly of nuclear weapons clearly have no equivalents in the commercial industry. In addition, it should be noted that DOE is already regulated by several outside agencies such as the Environmental Protection Agency, the Department of Transportation, the Occupational Safety and Health Administration, and several States. Hence, the perception that DOE is a self-regulating agency is largely overstated.

QUESTIONS SUBMITTED BY SENATOR SLADE GORTON

Senator GORTON. Grumbly, in her strategic alignment initiative announced last summer Secretary O'Leary cited the need for more decision making authority to be invested at the site. A good example of this is DOE's K-Basin project at the Hanford Reservation in Washington State. After the department ceded all major decisions to the site manager, the cost of the project dropped from $1.1 billion to $727 million, and 4 years were shaved off the total time of completion. Obviously this initiative is working. Why?

Mr. GRUMBLY. The K-Basin fuel relocation effort has been successful for several reasons. First, the Department recognized the urgent need to move the corroded spent nuclear fuel away from the shores of the Columbia River. This project is a national priority. I challenged the Headquarters staff and Richland Operations Office staff to accelerate the project and we have had a great deal of success with this effort to date.

Second, the project team continued to look for ways to improve the plans to relocate the K-Basin spent fuel. Early efforts were successful because of innovative approaches to execute mitigating activities in parallel, instead of using the traditional "in series" or sequential methods. These innovative approaches were developed by Headquarters and Field staffs and received full departmental support.

Although the parallel methods bring more risk to the project and require more planning and coordination, the benefits in cost and schedule reduction shortening are clearly worth it. One example of the parallel approach is the phased safety analysis to develop the necessary safety documents, as opposed to a protracted review and approval process. Another example is the use of the partially built waste management project, the High-Level Waste Canister Storage Building, which was canceled recently, and using it as the basis for the new storage facility. By completing and using this facility for the K-basin spent fuel, we are able to contribute $17 million and a 1-year schedule reduction toward the K-basin project.

Finally, the authority for key decisions was delegated from Headquarters to the Operations Office Manager. This allows the project-specific decisions to be made where the work is done. One positive impact of this delegation is the reduction in the length of time it has taken for the Environmental Impact Statement to Record of Decision process: 49 weeks and a total cost of $1.3 million. The average EIS to ROD process requires a total of 18 months and tens of millions of dollars.

To make the delegation of authority successful, however, a policy was developed and co-signed by Tara O'Toole, Assistant Secretary for Environment, Safety and Health, and myself, Assistant Secretary for Environmental Management, spelling out the roles, responsibilities and accountability of the participants. This has allowed both Headquarters and Operations Office staffs to reduce uncertainty in the planning of the aggressive K-basin schedule. With this delegation has come the commitment of technical expertise and support from Headquarters and around the DOE complex, to ensure the project team has access to the resources necessary to be successful. This Headquarters and Field team approach ensures that the site-specific project decisions are consistent with Departmental policy and provides feedback on areas requiring further policy clarification.

It would be difficult to re-prioritize and dedicate this many resources to every project at or throughout the Department of Energy complex. The K-Basin project demonstrates that taking a managed level of risk when resolving a major issue can be done, and done successfully. The Department is continuing to seek opportunities to cut the red tape and streamline our processes to get the most done for the tax payer dollar.

Senator GORTON. If your answer is that a local manager is better able to determine what the needs of his program are at the site, rather than a DOE bureaucrat in Washington, D.C., then shouldn't the Department, and Congress, delegate even more authority to site managers?

Mr. GRUMBLY. The Department generally supports empowering Operations Office managers, field office managers, and project managers as much as possible, and has dramatically increased the authority of these managers during the past 3 years. Most cleanup decisions are made by the Department's managers at each site, because they have the relevant knowledge, experience, and familiarity with the site's conditions. While Headquarters will continue to delegate authority to the field, as appropriate, the Department believes that it would be imprudent to legislate the level of authority and decisionmaking at Headquarters and the field. The Secretary of Energy should have overall authority for major financial and managerial decisions to ensure a corporate budget discipline, Administrative flexibility, and an ability to develop consistency across sites. Moreover, legislating details of management authority usurps the fle3dbility required for maximizing efficiency.

The Department has been examining options to provide more flexibility to each site. Among these is the streamlining of the Department's reprogramming process, establishing higher funding thresholds for internal reprogrammings, and proposing that more activities be funded strictly from operating expenses. We know that the reprogramming process needs to be streamlined and have been working with other Departmental organizations and the Office of Management and Budget to improve the process. Higher reprogramming levels would also provide more flexibility since the need for official reprogrammings would decrease. In addition, having more activities, such as safety analysis reports, project and design documents, and National Environmental Policy Act (NEPA) documentation, funded entirely through operating expenses, like the Environmental Restoration program would provide much needed flexibility for environmental efforts.

However, in cases where there is a cross-cutting impact on the Environmental Management's program activities, especially of a budgetary nature, a broader view than that of the site manager must be introduced into the clean-up decision. For example, budget cuts often require a national management perspective to ensure some equitable distribution of scarce funds among the sites. In addition, delegating certain authority would greatly reduce the Department's ability to implement national policies. Highly radioactive wastes and other nuclear materials, such as plutonium, need to be, dealt with within the framework of a comprehensive national strategy. We believe the best way to manage these issues at sites is to consolidate, not proliferate, accountability through greater integration.

Senator GORTON. Say, for example, on the issue of reprogramming requests. We give a site like Hanford a budget of $1.5 billion—yet we make the site manager go through an inordinate amount of budgetary hoops to have a simple transfer of funds within the site's numerous accounts. If a site manager can employ initiatives to save money on one project shouldn't he be able to apply those savings to other projects at his sites?

Mr. GRUMBLY. The Department of Energy is required by law to submit a reprogramming request to Congress whenever Environmental Management funding over $1 million is moved from one program account to another. Under the current budgeting structure, the management focus is on the type of program activity being conducted, rather than on the site where the work is being performed. This places emphasis on budgeting for individual program budgets rather than achieving an optimum balance wrong priorities at particular sites.

Last year the Department submitted a management and budgeting pilot initiative to Congress. This pilot would have appropriated Environmental Management funds specifically for activities at the Rocky Flats Environmental Technology Site rather than in the traditional program categories of waste management, environmental restoration, technology development, etc. The Office of Environmental Management discussed the proposal during the fiscal year 1996 budget reviews with cognizant Congressional committees. Unfortunately, these Congressional committees decided against the proposal, saying that site budgeting would introduce unwanted political implications into the budget process.

Would the Department like to see its site managers have greater control of funds across accounts at their sites?

Mr. GRUMBLY. Yes, a budget focused by site rather than by category of work would have the advantage of allowing the site manager additional flexibility to engage the State governments, regulators, and the Site Specific Advisory Boards in discussions that determine priorities from a comprehensive perspective at the respective sites. Such discussions would be premised on achieving the greatest risk prevention and risk reduction per dollar spent and would foster cooperation of all interested parties by giving them a greater stake in seeing the program succeed.

Senator GORTON. What steps is the Department prepared to take to assure greater autonomy for its site manager?

Mr. GRUMBLY. Beginning with the fiscal year 1997 Congressional budget request, the Department will consolidate the major program activities for Rocky Flats within the Environmental Restoration budget will provide the site manager with greater flexibility to achieve savings and efficiencies or to address emerging requirements.

Also, the Office of Environmental Management has made changes to its internal budget development procedures, which will allow site managers increased autonomy. In previous years, Environmental Management initiated its internal budget development process by sending several programmatic funding targets to each site. Beginning with the fiscal year 1998 budget cycle, site managers are being provided a single overall funding target and are being asked to propose the best and most efficient program. Within this single control level, site managers are free to distribute proposed planning year funding as needed among the Environmental Management programs.

Another improvement being incorporated into the fiscal year 1998 internal budget process involves performance-based budgeting. Additional Environmental Management funding will be made available to those sites that have best demonstrated effective, efficient results-oriented performance and the potential for continuing to manage for results.

REGULATORY RELIEF

Senator GORTON. Also at the Hanford site, the DOE has undertaken an initiative to assure clarity in the regulatory process. At a meeting in St. Louis last spring, the Department, Washington State and EPA got together and concluded that the best approach was to decide among themselves one regulator per project, in order to avoid regulator overlap. Has this worked?

Mr. GRUMBLY. Yes, it is anticipated that the implementation of provisions calling for a "single regulator" in the Tri-Party Agreement for the Hanford site, will streamline the Departments environmental compliance process by improving coordination, minimizing conflict among the agencies responsible for overseeing activities at the site, and by avoiding the potential for disputes and conflicting requirements. The new provisions also focus more on accomplishing "on the ground" work than on paperwork milestones, and on improving site-wide decision-making, particularly to ensure that higher risk activities and safety concerns are addressed first.

Over the past year, the Department has successfully negotiated modifications to the Hanford Tri-Party Agreement. DOE, EPA, and the State of Washington participated in this effort in "Workout Sessions" with the common objective of creating a more efficient and cost effective compliance process within the structure of the Hanford Tri-Party agreement. One product of these "Workout Sessions" was the "Blue Print for Action and Cost Control" where the parties established a number of commitments including executing a tentative agreement to amend the Hanford Tri-Party Agreement. This amendment officially executed on February 23, 1996, promises to streamline actions under the Tri-Party Agreement by providing appropriate authority and control to personnel who are responsible for directing the actual cleanup actions in the field. The amendment also adopts a "single regulator" concept, described above, in, which only one regulatory agency will generally be involved in the day-to-day oversight and decision making on specific environmental management activities.

TANK FARMS

Senator GORTON. You mentioned yesterday in your testimony to the Senate Energy and Natural Resources Committee that there were provisions of RCRA which your department could support changing. Specifically, what are those changes, and can they be altered without adversely affecting the Tri Party Agreement between Washington State, EPA and DOE?

Mr. GRUMBLY. RCRA has allowed the United States to make tremendous progress toward proper waste management and its implementation has minimized the creation of future Superfund sites. However, there is general agreement among the States, the Environmental Protection Agency and the regulated community, of which DOE is a part, that some reforms would be beneficial. In an effort to improve RCRA, last year the Environmental Protection Agency (EPA) convened a multi-stakeholder process, which included DOE, to obtain suggestions to improve the hazardous waste management system under RCRA. The government agencies involved in the Administration's multi-stakeholder process identified, and DOE supported, a number of possible areas of improvement to RCRA that would provide EPA with increased flexibility to tailor hazardous waste management requirements to the risk presented by particular wastes.

An example of the type of change suggested by the Department at the public meetings held by EPA is modification of the corrective action provisions. To facilitate the management of remediation wastes the Department supported making the applicable requirements more practical, effective, and cost-reasonable. At Senator Lott's request, EPA supplied technical comments on RCRA remediation waste legislation. EPA also engaged in discussions with States, industry, and environmental organizations on legislative proposals on RCRA remediation waste.

Another example of modifications suggested by the Department in the EPA-sponsored public meetings were changes to existing permit requirements to (1) promote the use of mobile treatment technologies for cleanup activities by allowing for multi-site use of such technologies (this would save the high costs of obtaining multiple permits for the same unit and be considerably more expeditious); and (2) allow for the issuance of a single class permit in cases where multiple treatment, storage, or disposal facilities of the same design will be built at the same or different sites. This would avoid redundant permits, necessary costs and delays.

At this time, however, the Administration is not actively pursuing any changes to RCRA. Earlier in this Congress, the Administration did support legislation to change land disposal restrictions for certain RCRA wastes. That legislation has been enacted.

Senator GORTON. Mr. Grumbly, as a follow up question, I understand the Department recently announced it should be externally regulated on most if not all, of its cleanup initiatives. Yet in the case of Hanford's massive Tank Waste privatization effort, I understand the Department has not decided who will regulate the privately financed, constructed and operated facility to be built there. Why the delay?

Mr. GRUMBLY. We regret that the regulatory framework under which the privatized TWRS vendors will construct, build, and operate their facilities has not been adequately conveyed to you. From the outset of this effort, we have attempted to clearly state the requirements for safety and environmental regulation, and which agencies will have those responsibilities.

There is no delay in our efforts to assure the regulation of activities that can impact safety or the environment. Because of the transition from a management and operations to a privatized contracting mechanism, details regarding the overlapping jurisdictional authorities between agencies needed further definition. Furthermore, while the Department is moving to external regulation on a deliberate schedule, the current regulatory requirements must be accommodated. The Department is committed to meeting the existing applicable legal and regulatory requirements.

In planning for the transition to privatized processing of Hanford tank waste, the underlying goal has been to move to external regulation while utilizing the regulatory framework that is already established and functioning.

Senator GORTON. Which organizations are under consideration?

If DOE decides not to regulate the private facility, does the DNFSB, NRC, EPA or Washington State have sufficient protocols to undertake such an endeavor?

If not, how long is it projected to take those protocols to be established?

Mr. GRUMBLY. The regulatory framework under which the Phase I TWRS Privatization procurement will take place falls into the following three general regulatory oversight domains: The EPA and Washington State Department of Ecology and Health have ongoing programs and capabilities for environmental management. These agencies will be responsible for the environmental regulation of the TWRS privatized contractors. This fact is clearly stated in the RFP and in our briefings since February 1995.

With regard to occupational and industrial safety, the Occupational Safety and Health Administration, as well as the Washington Industrial Safety and Health Administration, have ongoing programs with established regulations, and inspection and enforcement capabilities. They both have operating field organizations that are currently implementing these functions. The only issue with OSHA in regulating this effort is that current budget decreases that may deprive the agencies from sufficient field resources to execute their responsibility. They are reluctant to undertake the effort without adequate resources, which can give the false impression of adequate safety. Under the occupational and industrial safety programs, oversight will not be necessary until site activities commence; construction of the privatized facilities may begin as early as December 31, 1999, while processing must start by June 1, 2002.

To place the radiological and nuclear safety issue in proper perspective, please realize that processing of high-level radioactive waste, if executed by a company as a commercial business, would require a license from the Nuclear Regulatory Commission as the formal control for radiological and nuclear safety. At this time, NRC does not have a set of regulations in place that would readily cover this type of operation. Extensive discussions have occurred with the NRC to develop a Memorandum of Understanding to define the framework for developing their regulations and for interactions between the two agencies regarding privatized contractors. DOE will regulate Phase I of the Privatization effort and expects NRC to assume the regulatory authority for Phase II starting in 2005.

Senator GORTON. Also on the Tank Farms—it is my understanding that 2 percent of the waste in Hanford's 177 tanks accounts for approximately 99 percent of the radioactivity. Yet in terms of volume, the pilot vitrification project being solicited by the Department will only manage 6–13 percent of total waste volume in the tanks. What portion of the waste to be treated in the first phase of the vitrification process will be of that 2 percent of highly radioactive waste?

Mr. GRUMBLY. Phase I of TWRS privatization is intended to treat approximately 8–15 percent of the volume of the tank waste and approximately 7–12 percent of the radioactivity (curies). A more detailed explanation follows.

It is true that the bulk of the radioactivity is associated with a very small mass of the waste. However, due to past waste management practices this small mass of radioactive materials has been dispersed relatively uniformly throughout the approximately 215,000 m^3 of waste contained in the 177 Hanford waste storage tanks. For the purposes of answering this question, we are assuming that the reference to "highly radioactive waste" refers to the fraction of the Hanford tank waste that is ultimately destined for disposal in the geologic repository, commonly referred to as high-level waste.

The Phase I of Tank Waste Remediation System (TWRS) privatization (pilot vitrification project) includes two major areas of work: one is designed to address management of the bulk of the mass and volume of the waste (the low-activity waste or LAW portion); the second is designed to address the high-level fraction of the wastes. The 6–13 percent of the waste referred to in the question is that portion of the waste associated with the LAW portion of the work scope. This scope of work specifically requires each of two vendors to process between 2,800–5,100 MT of sodium (Na) for a total processing of between 5,600 and 10,200 MT of Na. This corresponds to approximately 8–15 percent of the total Na contained in the tanks. If, as can be reasonably assumed, the Na is relatively uniformly distributed throughout the tanks, about 17,000—32,000 m^3 (8–15 percent) of the currently estimated volume of waste contained in the tanks will be processed.

The high-activity or high-level portion of the work scope requires the processing of between 245 and 465 MT of tank waste solids (expressed as waste oxides excluding sodium and silicon). If the mass of HLW solids is equal to a nominal value of approximately 4000 MT, this corresponds to treating approximately 712 percent of the high-level waste solids present in the Hanford tank wastes. Since approximately 99 percent of the radioactivity (curies) in the Hanford tank waste in present in these solids, this corresponds to treating approximately 7–12 percent of the total radioactivity present in these tanks.

Senator GORTON. Is the Department confident that it can sufficiently guarantee waste feed to the contractor for phase one of the Tank Farm project? How about phase two?

Mr. GRUMBLY. The Department has a high level of confidence that waste can be delivered to Phase I vendors. The Department will deliver the majority (83 to 88 percent) of Phase I feed using existing equipment and process lines. Delivery of the remaining Phase I (12 to 17 percent) will be available upon completion of currently funded projects and one additional transfer line to vendors.

Phase II retrieval will be the responsibility of the private contractor. Budget guidance for the Management and Operations contractor will limit the planned retrieval and transfer of single shell tank waste into double shell tanks during Phase I, for later Phase II processing.

ECONOMIC DEVELOPMENT/COMMUNITY

Senator GORTON. As you are well aware, recent layoff announcements at the site have created turmoil in the community. Is the Department capable of delaying more layoffs until the new contractor takes over its responsibilities on October 1, 1996?

Mr. GRUMBLY. The Department does not anticipate a requirement to announce any additional workforce restructuring in fiscal year 1996 beyond the level announced in January. Implementation of action pursuant to that announcement, and the earlier announced restructuring of approximately 4,774 workers, is expected to occur over the rest of the fiscal year, in order to accommodate priority work requirements and budget constraints, as well as to meet commitments under the Management and Efficiency Initiative of the Tri-Party Agreement.

The employment implications of the fiscal year 1997 budget levels are not clear at this time. We expect that there is likely to be some impact, but the exact amount depends on a number of factors. These include final disposition of the fiscal year 1997 budget request the award of a new Project Hanford Management Contract, and the tank waste privatization which could result in a restructuring that shifts how employees are employed, and by whom. In the long run, we believe that privatization will mean more jobs for the Hanford community, not fewer, although there may be some substantial short term job impacts.

FFTF

Senator GORTON. Does DOE plan to maintain the Fast Flux Test Facility as an option until a final decision has been made on a facility for tritium production?

Mr. GRUMBLY. The Department continues to conduct a full and fair evaluation of the tritium production capabilities of the Fast Flux Test Facility. Pending the outcome of our evaluation, all irreversible shutdown activities which could potentially limit the ability of the facility to return to operations have been placed on hold.

[Whereupon, at 5:30 p.m., the hearing was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1997 AND THE FUTURE YEARS DEFENSE PROGRAM

WEDNESDAY, MARCH 13, 1996

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

DEPARTMENT OF ENERGY ATOMIC ENERGY DEFENSE PROGRAMS (NUCLEAR STOCKPILES STEWARDSHIP AND MANAGEMENT)

The subcommittee met, pursuant to notice, following a closed briefing, at 10:08 a.m., in room SR–232A, Russell Senate Office Building, Senator Dirk Kempthorne, presiding.

Committee members present: Senators Kempthorne, Hutchison, Exon, Bingaman and Bryan.

Also present: Senators Thompson and Frist.

Committee staff members present: Romie L. Brownlee, staff director; Christine K. Cimko, press secretary.

Professional staff members present: Gregory J. D'Alessio.

Minority staff members present: William E. Hoehn, professional staff member; Frank Norton, professional staff member.

Staff assistants present: Shawn H. Edwards and Franklin H. Turner.

Committee members' assistants present: Glen E. Tait, assistant to Senator Kempthorne; David W. Davis, assistant to Senator Hutchison; Andrew W. Johnson, assistant to Senator Exon; Edward McGaffigan, Joint Requirements Oversight Council, assistant to Senator Bingaman; Randall A. Schieber, assistant to Senator Bryan; Mary Weaver Bennett, assistant to Senator Bryan; Elizabeth Wood, assistant to Senator Thompson; Brian Caidman, assistant to Senator Kempthorne.

Committee members' fellows present: Ninette Sadusky, fellow to Senator Robb.

Senator KEMPTHORNE. Ladies and gentlemen, we will continue the hearing. We are now in open session.

OPENING STATEMENT OF SENATOR DIRK KEMPTHORNE, PRESIDING

Senator KEMPTHORNE. I would like to welcome everyone to this hearing.

By way of explanation concerning the closed session, it was to receive from GAO an outline of a study which Senators Thurmond and Nunn had requested with regard to the Weapons Quality Assurance Program. I think it is fair to say, as was pointed out, that not all of the tests have been completed, and there were some areas of concern that were discussed. With that, we will continue with this hearing.

Today, the Strategic Forces Subcommittee meets to hear testimony on the Department of Energy's DOE Defense Program, which is responsible for maintaining the nuclear weapons stockpile in a safe and reliable condition now and in the future. We will also hear about the DOE Nonproliferation and National Security Program.

While the Congress does not have the department's fiscal year 1997 budget request at this time, we do note that the top level features of the fiscal year 1996 budget are contained in the written submissions of Secretary Curtis and Dr. Reis. This information will be very helpful as the subcommittee seeks to assess the Department of Energy's program to meet the active and the inactive stockpile requirements of the Department of Defense.

I would also like to say how glad I was on being informed that President Clinton had signed the fiscal year 1996 Nuclear Weapons Stockpile Memorandum on Monday. We did not have a fiscal year 1996 Stockpile Memorandum and it is now well over a year since the Nuclear Posture Review has been completed.

I would note that, as it was signed on Monday and this hearing is taking place on Wednesday, I think there is a little more than a bit of happenstance that it has occurred on Monday.

The subcommittee looks forward to hearing about the assumptions underpinning the new Stockpile Memorandum and how it proposed to meet all of the requirements of the Nuclear Posture Review, especially those pertaining to the DOE nuclear weapons infrastructure.

As was the case last year, the subcommittee wants to look at the current requirements to determine if DOE can support the stockpile with its present strategy and its budget. Likewise, the subcommittee will want to hear if DOE has the capability to meet these requirements now and in the next 5 to 10 years, and in the long-term as well.

Another important document released in the last 2 weeks is DOE's draft Programmatic Environmental Impact Statement for Stockpile Stewardship and Management.

This document suggests that DOE can make further cuts in the four nuclear weapons manufacturing plants while recapitalizing some of their capabilities at the three weapons laboratories.

The PEIS appears to underestimate the value of the production sites despite the specific guidance in 1996 Defense Authorization Bill.

In our second panel, the subcommittee will hear from the managers of the production sites to get their thoughts on the draft PEIS.

The subcommittee will also want to hear about the manufacturing plan that DOE admitted it did not have last year. For example, is there a plan for a quick surge production capability should the world situation become more dangerous, as it has so many times before.

In addition, we now have serious indications that the Russians may have clandestinely tested a nuclear device in January. We must approach such indications cautiously, but objectively.

While the United States is reducing the number of weapons scientists in our laboratories and plants, at the same time DOE funds are being used to support the integrity of the Russian nuclear weapons team by funding some 2000 of their scientists for fear they will migrate to Iran or Iraq.

Now I favor helping the Russians control their fissile materials, but the subcommittee will want to insure DOE funds are not being used in a way that conflicts with U.S. national security objectives.

Finally, DOE appears to be basing its investment program on START II weapons levels before START II is ratified.

At last week's full committee hearing with Secretary Perry, the Secretary affirmed the commitment to maintain a START I force until Russia ratifies the START II treaty.

Mr. Curtis' written testimony last year indicated that DOE does not plan to have sufficient tritium to fill the inactive stockpile nor to provide limited life components for it. The subcommittee will want to investigate these issues today.

In summary, the subcommittee wants to insure that the administration has a workable strategy and is requesting sufficient funding to meet the requirements of our National Security Policy for the nuclear deterrent. If the current Department of Energy plan cannot meet all of those requirements, then this subcommittee needs to know that.

As I'm sure our witnesses know, this committee stands ready to work with the administration to address these important issues.

With that, I wish to allow each of the Members, the Senators that are here, to make any comments they may wish.

[The prepared statement of Senator J. James Exon follows:]

PREPARED STATEMENT BY SENATOR J. JAMES EXON

Thank you, Mr. Chairman. I join you in welcoming our first panel to today's hearing. I hope this can be a productive hearing, although the fact that DOE's fiscal year 1997 budget request has not yet been submitted to the Committee will pose some difficulties. I suspect we may find, once the DOE budget is made available, that we have a number of questions about the budget, but our hearings will already be over. Could we agree, Mr. Chairman, to have the subcommittee send our witnesses some supplemental questions after the budget is available, and ask that they be answered in writing prior to markup, and included in the hearing record?

Mr. Chairman, last year's hearing occurred while DOD's stockpile stewardship plans were just being finalized. They had not been reviewed by the U.S. Strategic Command or by the Department of Defense, so the Committee had no outside assurance of the adequacy of those stewardship plans. I look forward to hearing from today's witnesses whether this situation has changed in any respect. Many of us on the Minority side were also concerned about a number of the additions in the Chairman's markup for items like preparations for hydronuclear testing and for reconstituting a production base for new nuclear weapon. I look forward to the testimony from our witnesses.

Senator KEMPTHORNE. Senator Bingaman.

STATEMENT OF SENATOR JEFF BINGAMAN

Senator BINGAMAN. Thank you very much, Mr. Chairman. I do look forward to the testimony.

My understanding of what the testimony here says—and I do think we need to explore this—is that it does disagree with some of what you said in your opening statement. My understanding is that the Department does plan to maintain the capability to stay at START I levels and that that is part of what is in their planning, and there is nothing in what has been proposed to this Congress that would contradict that.

So I think we need to get into that when we get into the discussion with the witnesses.

Thank you.

Senator KEMPTHORNE. I, too, Senator Bingaman, look forward to that. But, rather than stating that what I have stated is inaccurate, it is based upon what was said last year. Now if there has been a change, then that change is for the better and I welcome that. But we want to get on record if there is a change. Senator Thompson, from Tennessee, we welcome you.

STATEMENT OF SENATOR FRED THOMPSON

Senator THOMPSON. Thank you, Mr. Chairman. I appreciate you letting me sit in here with you today. I can hardly think of anything that is more important than whether or not we are doing anything that diminishes our ability to protect ourselves in the future.

It seems to me that this report that I have read, the PEIS, is based upon several assumptions. One is that START II will go forward. The other is that the former Soviet Union will remain docile. The other is that the rest of the world will not produce significant problems for us that we are not anticipating.

We have seen these kinds of assumptions after every major conflict I think this country has ever had. In every case they have been wrong. It has cost us in terms of lives and capabilities as we try to restart to meet the new threat that we could not foresee a short time before.

It seems that we are stopping production of our nuclear components. We are stopping testing, including even underground testing. We are radically downsizing our production capabilities. In Oak Ridge alone, which manufactures the secondary and case components, they are talking about a 90 percent downsizing in terms of physical capabilities and a reduction of from 2,350 employees to 455 employees over a period of 7 years. This would undoubtedly cause a loss of expertise which could not be replicated.

These are not automobile manufacturers or widget makers. We are going to be relying more and more on scientific estimates and computer simulations for testing, as opposed to the on-hands testing that we have had in times past. If those things work out as we hope they will, all well and good. But it looks to me like we are placing an awful, awful lot of dependence on things that are not yet tested.

So I think what you are doing here today in this hearing is of fundamental importance and I appreciate your allowing me to sit in on it.

Senator KEMPTHORNE. Senator Thompson, thank you very much. We welcome your participation this morning. With that, Senator Bryan.

STATEMENT OF SENATOR RICHARD H. BRYAN

Senator BRYAN. Thank you very much, Mr. Chairman. I welcome the witnesses here this morning. I will obviously be interested in hearing the details of stockpile stewardship as it relates to the Nevada Test Site, the Comprehensive Test Ban, and some of the issues that are related to the readiness there at the test site.

I look forward to hearing the testimony of the witnesses.

Thank you, Mr. Chairman.

Senator KEMPTHORNE. Senator Bryan, thank you very much.

With that, I turn to the witnesses. Again, we are delighted to have all of you here and are honored that you are here. We look forward to your comments.

Let me begin with Mr. Charles Curtis, Deputy Secretary, Department of Energy. Mr. Secretary.

STATEMENT OF HON. CHARLES B. CURTIS, DEPUTY SECRETARY, DEPARTMENT OF ENERGY

Mr. CURTIS. Thank you, Mr. Chairman and members of the subcommittee. I am pleased to have the opportunity to address the subcommittee's quite serious concerns. They are appropriate concerns and subjects of inquiry. You need confidence that the department's plans and its resources are properly focused and committed to providing for a safe and reliable nuclear deterrent. We believe we have done that, and we believe that we can give you confidence in that matter as well.

Obviously, we are here to discuss the department's budget in advance of the budget actually being submitted to the Congress, an awkward circumstance in the extreme. But, we will try for the benefit of the committee to give some definition to that which is contained within the top line figures that you see in my statement so that, indeed, the committee can make an informed judgment about these matters.

Mr. Chairman, just let me say, quite explicitly, that the department is committed to maintaining an effective nuclear deterrent while working to reduce the nuclear danger. That expression is intended to incorporate both our responsibilities to the enduring stockpile as well as our nonproliferation activities that are an important element of the department's work, particularly in the former Soviet Union.

The President, as you know, has committed the United States to the achievement of a zero yield Comprehensive Test Ban Treaty, and much of the work to support implementation and verification of such a treaty falls on the shoulders of the Department of Energy. These are very serious mission responsibilities and we take them very seriously.

We believe the department can meet the challenge to maintain the deterrent through a well defined Stockpile Stewardship Program. But, as the President has noted, in order for this program to succeed, both the administration and the Congress must provide sustained, bipartisan support for the Stockpile Stewardship Program over the next decade and beyond.

So, I think, we should talk today not only about what is in the budget for fiscal year 1997, but what is required in the out-years to make this program work in order to meet the National security requirements set for it.

The nuclear weapons complex, both the laboratories and the production facilities, must be efficient. We have a stewardship responsibility to assure that they are cost effective and well managed, and we intend to discharge that responsibility. But, those laboratories and production facilities must also have the right tools and the equipment to meet the challenge that has been set out for us.

As you stated in your opening statement, the Secretary of Energy has announced the department's proposed plan that would enable the DOE complex to meet the new challenges. It is essentially a plan that contemplates a smaller, more efficient defense complex, comprised of three laboratories and four manufacturing facilities.

If the proposed plan is ultimately approved, the complex will have, we believe, the physical capability to meet a wide variety of stockpile scenarios, even in a constrained budget environment. It will be a system that provides for better linkage between our laboratories, our test site, and our production facilities than has characterized the complex in the past.

In December, the department adopted a plan for a safe and reliable supply of tritium and identified the Savannah River site for tritium processing and possibly tritium production. This plan will enable DOE to produce tritium by 2005 or 2007, if an accelerator is selected as the new production source for tritium.

The Secretaries of Energy and Defense have recently signed a joint memorandum to the President recommending a course of action for management of the stockpile. As you observed, the President on Monday executed the Nuclear Weapons Stockpile Memorandum, which provides support for the "lead" and "hedge" aspects of the Nuclear Posture Review.

As Secretary of Defense Perry said in hearings last week, the United States cannot move to START II on the basis of faith. Rather, we have to be very pragmatic about it.

The plans for the DOE complex and for tritium supply are pragmatic and flexible, and will support a START II stockpile or a START I stockpile, if necessary. We need to be very clear on this. The Department of Energy's planning and its capacity to support the stockpile will provide support for a START I stockpile if necessary.

A question that the Department of Energy must be prepared to answer today, and in the future, is: Can the Department of Energy, in the absence of nuclear weapons testing, continue to insure the safety and reliability of the stockpile? You stated that question in your opening remarks. Also, is the related question of whether our scientific and technical capabilities are up to the task and will they continue to be so in the future?

We believe we can answer that quite proper question in the affirmative. But, I want to return to a point I made earlier. To do so will require sustained funding of the work of the department and careful coordinated planning between the Department of Energy and the Department of Defense. This is a shared responsibility and a shared decisional process.

In a process that began last summer, the Department of Defense and DOE have worked together to design a stewardship plan that will assure mutual confidence in the nuclear stockpile. This is a plan that is filling in the detail of the stockpile stewardship plan that we had fleshed out in broad brush terms last year. This plan will be final in the very near future and will serve as the basis for the report required by section 3153 of the fiscal year 1996 Defense Authorization Bill. We are aware that the report is due on the 15th of March. We intend to have the report completed this month so that it will be available to you in your budget deliberations and can make informed judgments about these important matters.

Mr. Chairman, in the last few years, the Department of Energy has made significant progress in putting a complex that was in disarray in 1992 back on track to support the Nation's national security programs. We believe we have made very significant progress. We acknowledge much more needs to be done, if we are to successfully and effectively discharge this important mission responsibility.

Now, let me turn to a related and important part of our national security responsibilities, the nonproliferation activities of the department. These activities rest on the unique capabilities of the department's laboratories, which are an integral part of the Nation's total nonproliferation effort, which is one of this administration's highest priorities.

The threat posed by the spread of weapons of mass destruction is ever changing. Today, some 20 countries—20 countries—have, or may have the capability to develop weapons of mass destruction. This changes the strategic balance of the world or threatens to change the strategic balance of the world from what we had planned for and what we may be able to contain.

Through research and development programs and intelligence contributions, the Department of Energy plays and will continue to play a key role in assessing and addressing this nuclear danger. A special element of that contribution of the Department of Energy's program is its laboratory-to-laboratory and Government-to-Government cooperative initiatives in which we are engaged with our counterparts in the former Soviet Union.

The department has worked cooperatively to establish an enhanced nuclear material security in the former Soviet Union. It is an enormous problem, one of great significance and urgency, and it is a matter that, we believe, we have made significant progress on. We are asking in this budget to continue to provide financial support for this initiative and to increase the initiative.

What is pacing this effort right now is opportunity. Namely, the opportunity that is provided by the cooperation of the Russian Federation, primarily, enabling us to gain access to and assist the Russian Federation in strengthening their security systems for the nuclear material. Material that is widely distributed through some 80 to 100 facilities at some 40 to 50 sites in the former Soviet Union. It is a very, very significant problem. We will be happy to entertain questions on this problem.

Another problem, though, has to do with the potential brain drain or diversion of the talent that is contained in these laboratories to nefarious actions in the former Soviet Union—again, something you raised in your statement. The department has addressed this problem primarily through the Industrial Partnering

Program, a program that brings U.S. industry together with our laboratories and the Russian institutes in an attempt to engage Russian scientists and engineers in meaningful in nonweapons activity, activity of commercial value.

We are very pleased with the success of this program. We are very pleased that the program has had bipartisan support in this Congress after initial authorship by Senator Domenici. We believe that the program is a very effective thing to do, and we understand that a quite legitimate question to ask is whether the totality of these programs, which do, in fact, place money into the former Soviet Union, is consistent with our national security interests.

I believe, the answer to that question is emphatically yes, and I look forward to the opportunity to discuss it fully with the committee.

At this time, if I may, I would conclude my remarks with the simple observation that I welcome your questions on these important matters. They are serious and I hope to convince the committee that the department is taking them seriously, as I am fond to say, by thought, word, and deed.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Curtis follows:]

Prepared Statement by Charles B. Curtis

INTRODUCTION

Good morning Mr. Chairman and members of the committee. Thank you for inviting me to appear before the committee to discuss the Department of Energy's national security programs. The Department has made significant progress in these essential programs over the past year and will continue to progress in the coming years. The ever changing United States security environment demands continuing flexibility on the part of the Department to meet a wide variety of contingencies. The cessation of underground nuclear weapons testing; the President's commitment to achieve a true zero yield Comprehensive Test Ban; U.S. ratification of the START II treaty and a determination by the Department of Defense to rely on existing weapons types to provide this Nation's deterrent, are circumstances that have redefined the Department's national security responsibilities. At the same time, the Department continues to respond to the new and varied nonproliferation threats and arms control opportunities in the post Cold War environment. I welcome the opportunity to discuss both the challenges and the opportunities facing the Department of Energy.

The Department of Energy's budget request for fiscal year 1997 for atomic energy defense activities is $10,867,012,000 a $228 million increase above the fiscal year 1996 level. Of the amount requested for fiscal year 1997, $5,457,702,000 is for national security programs. This includes $3,710,002,000 for weapons activities, $586,972,000 for Nonproliferation and National Security programs, $93,796,000 for fissile materials disposition, $67,000,000 for worker and community transition, $663,932,000 for Naval Reactors and $72,200,000 for Nuclear Energy.

This morning I am accompanied by the Assistant Secretary for Defense Programs, Dr. Victor Reis, and the Director of the Office of nonproliferation and National Security, Ms. Joan Rohlfing. Both Dr. Reis and Ms. Rohlfing have prepared statements setting forth in detail the programs for which each is responsible. As a result, this statement only highlights certain key aspects of those programs. Separate prepared statements for the other important national security programs funded in the DOE budget for atomic energy defense activities were not requested by the subcommittee and, thus, will not be submitted. I will discuss these programs in comparatively greater detail in this statement.

DEFENSE PROGRAMS

Congress, in the Atomic Energy Act of 1954, found that the development, utilization, and control of atomic energy for military purposes is vital to the common defense and security. This commitment to a strong nuclear deterrent continues today in the Department of Energy as a key part of the Nation's security posture. In announcing his decision to support a zero yield test ban treaty, President Clinton reaffirmed his commitment to nuclear deterrence: "As part of our national security strategy, the United States will retain strategic nuclear forces . . . I consider the maintenance of a safe and reliable nuclear stockpile to be a supreme national interest of [he United States."

Last year, in testimony before this committee, I discussed the challenging responsibility facing the DOE to ensure the safety, security, and reliability of the enduring nuclear weapons stockpile in the absence of testing, and in the absence of any requirement to produce newly designed weapons. Since last appeared before the subcommittee, the Department has, in conjunction with the Department of Defense, refined the Stockpile Stewardship and Management program, to meet these challenges. DOE has been working closely with the Department of Defense to shape and implement a stockpile stewardship and management program to meet fully the requirements of the Nuclear Posture Review.

The Secretary of Energy last month announced a specific set of proposals designed to reshape the DOE complex to fulfill the goals of the Stockpile Stewardship and Management Program and maintain deterrence as directed by the President. Our objective is to evolve a program that:

- Fully supports at all times, the U.S. nuclear deterrent with safe, secure, reliable, nuclear weapons while transforming the nuclear weapons complex (laboratories and production facilities) to one that is modern, efficient, and sized to maintain she enduring stockpile. A modern, efficient, environmentally sound complex will, allow DOE to meet all contingencies identified by DOD, economically and expeditiously.
- Preserves the core intellectual and technical competencies of the weapons laboratories and the manufacturing facilities. Without nuclear testing, confidence in the U.S. nuclear deterrent will be especially dependent upon the competency of the people who must make the scientific and technical judgment related to safety and reliability of U.S. nuclear weapons and those who must make the weapons and weapons components when needed. The stockpile stewardship and management program will provide the tools, and enable the people responsible for maintaining the credibility of the nuclear arsenal, to have the fundamental understanding of the scientific phenomena associated with nuclear weapons. This knowledge and these tools will allow early detection and repair of any problems that may arise with the stockpile and ensure that new people brought into the complex are ready to assume responsibility in the future.
- Ensures the activities needed to maintain the Nation's nuclear deterrent are coordinated and compatible with the Nation's arms-control and nonproliferation objectives.

TRITIUM

Tritium gas is a critical element in the operation of nuclear weapons and is, therefore, essential to the United States' ability to maintain its nuclear deterrent. Because tritium, a radioactive isotope of hydrogen, decays at the rate of about five percent per year it must be replenished on a periodic basis. Since 1988, the U.S. has had no capability to produce this essential gas. In October, the Department announced its dual track strategy for acquiring new tritium production capability. The two tracks are (1) purchase of an existing commercial light water reactor or irradiation services and (2) development of a linear accelerator. An additional part of the strategy is the development of a contingency plan to utilize existing light water reactors, if necessary in the Nation's security interest. The Department will pursue both tracks and select a tritium production method in 1998.

DOE went through a comprehensive and open process to develop the dual track program. The strategy is designed to ensure that adequate tritium is available when needed, and that it will be provided safely and reliably. DOE is planning to have tritium production capability by 2007 if the accelerator is the technology chosen and by 2005 if the light water reactor is chosen. The $50 million was appropriated for the tritium program in the fiscal year 1996. The Department has identified an additional requirement of $27 million, that will be required to be made available for tritium in this fiscal year (1996) budget. DOE is requesting $100 million in fiscal year 1997 for the tritilum program. Schedules for both the accelerator and light water reactor tritium production are attached.

NONPROLIFERATION AND NATIONAL SECURITY

The President has made nonproliferation one of his highest national security priorities. The threat of the spread of weapons of mass destruction and their delivery systems, the insecurity of weapons usable fissile materials, the acquisition of dual use technology and equipment, and the continuing development of covert indigenous capabilities by proliferant states, are serious dangers that threaten the United States and challenge international stability. The Department of Energy and its laboratories are uniquely situated to provide the expertise and leadership to address these threats.

To reduce the international proliferation threat, the Office of Nonproliferation and National Security will focus its resources and expertise on eight priority programs:

- securing nuclear materials, technology, and expertise in Russia and the Newly Independent States;
- maintaining effective protection, control, and accountability of nuclear materials, technology, and expertise in the United States;
- limiting weapons usable fissile materials worldwide;
- ensuring transparent and irreversible reductions of global nuclear stockpiles;
- supporting the completion of a Comprehensive Test Ban in 1996;
- developing and integrating a program for preventing, detecting, and responding to nuclear terrorism and smuggling;
- controlling nuclear exports; and
- strengthening the nuclear nonproliferation regime.

MATERIALS DISPOSITION

Long-Term Storage and Disposition of Weapons Usable Fissile Materials

One of the key challenges arising from the end of the Cold War is the need for safe, secure, and environmentally sound management of weapons-usable fissile materials both in the United States and the former Soviet Union. Significant quantities of these materials, including plutonium (PU) and highly enriched uranium (HEU), are now no longer needed for defense purposes. Further agreements on disarmament between the two nations may increase the surplus quantities of these materials. Global stockpiles of weapons usable fissile materials pose a danger to national and international security if they are not properly managed and disposed of in a manner that effectively precludes their reuse in nuclear weapons.

Within the Department of Energy, the Office of Fissile Materials Disposition is responsible for the Department's technical and management activities to provide for the safe, secure, environmentally sound future storage of all weapons-usable fissile materials and the disposition of the fissile materials declared surplus to national defense needs. The Department's Fissile Materials Disposition Program directs research and development and technical demonstrations of plutonium disposition technologies and the design phase for site-specific long-term stora configurations involving a coordinated approach to the Department's inventory of weapons-usable fissile materials.

Program efforts also include technical and industrial activities associated with conversion of surplus weapons-usable highly enriched uranium to non-weapons usable low enriched uranium suitable for use in commercial power reactors. Through the Fissile Materials Disposition Program, the Department and its National laboratories are providing the technical expertise to support a joint U.S.-Russia study on technical options for the disposition of weapons-usable plutonium. The efforts of this program directly contribute to advancing U.S. and global nonproliferation interests involving Russia and other nations and to improving the cost-effectiveness of the Department's management of stockpiles of surplus fissile materials.

The goal of the Fissile Materials Disposition Program is to contribute to a reduction in the global nuclear danger associated with inventories of surplus weapons-usable fissile materials. The primary objectives of the program include:

- To provide a cost-effective, safe, secure, environmentally sound, inspectable, long-term storage configuration for the Department's weapons-usable fissile materials.
- To eliminate surplus stockpiles of highly enriched uranium and plutonium.

NUCLEAR SAFETY AND SECURITY

The Office of Nuclear Energy, Science, and Technology has responsibility, within the Department of Energy, for certain international programs related to nuclear safety, national security and nonproliferation. These programs are designed to:

- provide technical leadership for international nuclear safety and nonproliferation issues, including providing assistance to shut down the three Russian plutonium production reactors;
- assist in developing and maintaining nuclear safety centers of excellence both in the United States and in the states of the former Soviet Union; and
- assist the Ukrainians in the shutdown of the Chernobyl plant.

Technical Leadership

The Office provides policy and technical leadership for several critical initiatives concerned with nuclear technology, nuclear safety, and nonproliferation issues. A key element in the administration's nonproliferation policy, is the shutdown of Russia's three plutonium production reactors. In addition, the office of Nuclear Energy maximizes use of its existing programs to facilitate the transition of former Soviet nuclear and weapons scientists to non-defense activities, to engage in cooperative programs to address safety needs and non-proliferation issues at breeder reactors in the former Soviet Union, and to promote policies and develop spent fuel management plans to reduce the need for reprocessing nuclear fuel in countries of the former Soviet Union.

During the June 1994 session of the Gore-Chernomyrdin Commission, Russia agreed to shut down all of its plutonium production reactors by 2000. At the January 1996 Gore-Chernomyrdin Commission meeting, the Department presented preliminary results of technical assessments demonstrating the feasibility of converting the fuel for these reactors so that the reactors would no longer produce weapons-grade plutonium during routine operation. With this new core these reactors could continue to supply the heat and.electricity that they now provide. In addition, the Department is supporting completion of a preliminary assessment to use fossil-generated replacement power. In fiscal year 1997 the second phase of the core conversion safety and design analyses, and testing of new fuel will be completed. Implementation will begin if the analyses and testing results are satisfactory. Successful implementation of core conversion would end weapons-grade plutonium production in the these reactors before 2000. Funding for conversion activities will be the responsibility of the Russian reactor operator. Conversion could be financed through loans backed by revenue from improved operating efficiencies brought about by the conversion. In addition, Nunn-Lugar funding may also be available.

International Safety Centers

An international nuclear safety center to promote continuing improvement of nuclear safety worldwide through collaborative research and development and open exchange of safety information has been established. Through the U.S. safety center, the Department funds and supports collaboration with nuclear safety research institutions worldwide as a means of improving nuclear safety infrastructures and cultures. Earlier this year DOE initiated collaborative nuclear safety-related research and development with a similar Russian center. By the end of fiscal year 1997 DOE anticipates expanding existing collaboration with the center in Ukraine and with organizations in Germany and Sweden.

International Reactor Safety

Within the international nuclear community, there is substantial concern over the continued operation of Soviet-designed reactors in Eastern Europe and the former Soviet Union that do not meet Western standards of safe design, manufacture or operation. DOE helps address the need to strengthen the safety culture within these countries, and to improve the physical condition and operation of these nuclear power. This program has resulted in over 150 projects, involving 17 plant sites, regulator authorities and over 8 design and scientific institutes, as well as 21 U.S. commercial companies.

The Department is providing technical leadership in the effort to shut down the Chernobyl nuclear power plant. This plant continues to operate two reactors and is one of the most volatile nuclear situations in the world. Unit 4 of the plant was severely damaged in 1986. In the meantime, DOE supports efforts to ensure the safe, short term, operation of the plant, to address the problems of decommissioning and waste management, including storage of spent fuel, and to upgrades fire protection and operational safety systems.

Funding for all of the programs in the Office of Nuclear Energy described above was provided through the Office of Nonproliferation and National Security in fiscal year 1996. In the fiscal year 1997 budget request, this funding would be provided directly to the Office of Nuclear Energy, Science and Technology.

NAVAL REACTORS

The mission of this activity continues unchanged—engineering verification and improvement for over 130 operating naval reactors and development of a reactor for the Navy's new class of submarines. The Department of Energy is a partner with the Navy in the overall Naval Nuclear Propulsion Program; the Department's Office of Naval Reactors has responsibility for the reactor and the overall safety, reliability, and integration of the reactor plant.

The Naval Nuclear Propulsion Program has an impeccable operational, safety and environmental record—over 4,600 reactor years of operation without any accident or release of radioactivity to the environment. This record validates the long standing joint Navy/Energy arrangement for this program. This level of operating compares to 2,100 reactor years of operation for U.S. commercial nuclear power plants and a world-wide total of about 5,000 reactor years. Naval Reactors' position in the Department provides the necessary independence to ensure safety oversight and control; the engineering basis for Naval reactors and reactor plants, which underpins the safety and reliability effort; and gives the assurance needed for the Navy to obtain agreement from foreign nations for nuclear powered warships to operate in their territorial waters and visit their ports—all vital aspects of our defense posture.

Naval Reactors' longstanding record of, success can lead to the mistaken impression that running the Nation's largest reactor program has become a routine, institutionalized process. It has not. Continuing the Program's record requires constant technical vigilance. Consequently, the bulk of the fiscal year 1997 budget request goes toward strenuous testing, design confirmation, and improvements to the operating reactors. This is a most important consideration as these plants must operate under difficult conditions—high internal temperatures, presence of water as the coolant and means of transmitting energy, and radiation which is very corrosive to materials, coupled with constant transients in power needs to meet ship demands, the motion of a ship underway, and an operating life measured in decades now even for the reactor's core.

The advanced fleet reactor core, the core for use in the *Seawolf* Class submaines, has been operating in the Trident test reactor at the Kesselring Site in New York State for 2 years this month. The reactor has accumulated almost 7,000 hours of operation, the equivalent of over 7 years of fleet usage, and is performing flawlessly. Work on the next generation reactor for use in the new attack submarine is progressing on schedule.

As part of an aggressive downsizing effort, Naval Reactors has progressively reduced the number of test reactors from a peak of eight to two with the sixth plant shutdown only a week ago. An inactivation program is underway to realize the full savings from shutting down these plants and to put them in an environmentally benign condition.

WORKER AND COMMUNITY TRANSITION

The office of Worker and Community Transition works with the local communities to ease the transition to a reduced DOE presence and encourage viable reuse activities. In addition, the Office is responsible for assistance to DOE and contractor employees who are laid-off as result of DOE downsizing and the evolving DOE program requirements pursuant to section 3161 of the Fiscal Year 1993 National Defense Authorization Act.

The fiscal year 1997 budget request for Worker and Community transition is the only source of funds for assisting communities impacted by reductions inDOE contractor employment. In many instances these communities are isolated and their economies are disproportionately affected by the level of Department of Energy Activity. DOE works closely with the community reuse organizations to define the reuse activities and target those opportunities that have the best potential to provide community assistance and establish long-term self sufficiency.

In the coming year the Department will continue with its restructuring activities. DOE plans to complete closure of the Pinellas Plant in Florida, involving the separation of an additional 500 workers. Further reductions are anticipated throughout fiscal year 1997 and DOE will provide the much needed assistance as required by law.

CONCLUSION

The United States will continue to face a broad array of nuclear dangers. The Department of Energy is committed to using all of its unique and valuable resources to address the many challenges that will arise in an uncertain future. Through a strong stockpile stewardship and management program the DOE will be a strong partner with the DOD in maintaining a smaller yet effective, safe, reliable, nuclear deterrent. Through an aggressive program of non-proliferation efforts, including cooperative work with Russia and others, research and development, and technical assistance, DOE can help reduce the spread of nuclear weapons and technology and secure and disposition weapons grade fissile materials. The Department of Energy has strong programs in place to address the many aspects of the nuclear threat and will continue to be prepared to address any new or unforseen requirements. In meeting these challenges, some downsizing will inevitably occur. As the Department of Energy, the Department of Defense, and many other agencies of Federal Government have learned, reducing infrastructure and people is painful, but necessary. DOE will undertake any further reductions in the least disruptive fashion and will provide every assistance to affected employees and communities to ease the transition and facilitate reuse. DOE will meet all of its challenges and take advantage of its opportunities in a fiscally responsible way through well ordered and rational programs, carefully designed and assembled to meet urgent national security requirements and reduce the nuclear danger.

Senator KEMPTHORNE. Mr. Secretary, thank you very much.

Our next wit will be Dr. Victor Reis, who is the assistant Secretary for Defense Programs, Department of Energy. Secretary Reis.

STATEMENT OF DR. VICTOR R. REIS, ASSISTANT SECRETARY FOR DEFENSE PROGRAMS, DEPARTMENT OF ENERGY

Dr. REIS. Thank you, Mr. Chairman. There are three broad issues relating to Defense Program support of the nuclear stockpile. First, an assured tritium supply; second, the ability of the nuclear weapons complex, as a whole, to support the future stockpile; and, finally, the ability to maintain the safety and reliability of the stockpile indefinitely without underground testing.

As Deputy Secretary Curtis has mentioned, our assured tritium strategy is based on a dual track—commercial light water reactors and accelerator production. Our approach to the production complex of the future is to downsize in place and modernize the current complex. Both aspects of the program, I believe, are straightforward and easy to understand. Much more difficult to understand is how do we maintain the stockpile without underground nuclear testing.

One of the keys to making this happen is our ability to detect and assess defects, which we know from experience will occur. So, I would like to bring to this committee's attention one of a number of examples of how we are already doing this and what it means for the future. It is only by examining real cases that the credibility of the Stockpile Stewardship Program can be evaluated.

Senator KEMPTHORNE. Dr. Reis, apparently the microphones are not working. You are fading in and out. So, if you would, please bring the microphone closer.

Dr. REIS. Certainly. This is the good part, anyway. [General laughter]

Dr. REIS. Several years ago, as part of our surveillance program, we noticed that an aging phenomenon had caused a small defect in a particular weapon. Our original assessment was that the effect of this defect could range from negligible to large. The reason for this broad range is that the consequence of small defects, bumps and cracks, can be catastrophic in the rapidly changing, incredibly high temperature and density environment of a nuclear explosion. Our computations codes have not been designed to handle small perturbations.

In the past, there is no doubt that this uncertainty would have been resolved with underground nuclear tests. But, now the approach is different. Both Los Alamos and Livermore independently began to work the problem. They each used different special computational codes to assess the effects of the defects. To validate the newer codes they each designed and carried out physics experiments using lasers, pulse power devices, and shock tools. Further, a detailed review of the underground testing archive revealed that a similar defect had actually been observed, and the results of the new validated codes were able to explain the previously anomalous result.

All said and done, the independent effects estimated from each laboratory were identical, and small, I hasten to add. After a detailed review at the Department of Defense, it was decided that remedial action was not required.

This example demonstrates the power of the science-based stewardship approach: two laboratories, working independently, both using and developing the best scientific and computational tools and applying them to real problems on real weapons. The analysis was consistent with the extensive database from previous underground tests and underlying the final judgments were a vigorous peer review and continuous interaction with the Department of Defense.

This example also reveals that the key to successful stewardship rests not only in new tools, but in the expertise of the people who use them, the stockpile stewards. At the bottom line, the Nation's confidence in the enduring stockpile is dependent upon the skills, judgment, and courage of the men and women of the Los Alamos, Livermore, and Sandia Laboratories, the production complex, and the Nevada Test Site. Those qualities will be tested and challenged in the years to come, and, I believe, the President's Stockpile Stewardship and Management Program will provide them with the means to meet the awesome responsibility of maintaining nuclear deterrence without underground nuclear testing.

I urge your continued strong support for this program.

Thank you very much.

[The prepared statement of Dr. Reis follows:]

PREPARED STATEMENT BY DR. VICTOR REIS

I. INTRODUCTION

Defense Programs is requesting $3.7 billion in fiscal year 1997 to carry out our stockpile stewardship and management responsibilities. The need for a safe and reliable nuclear weapons stockpile remains unchanged. A credible nuclear deterrent remains the foundation of U.S. national security policy. President Clinton has stated on a number of occasions "the United States must and will retain strategic nuclear forces sufficient to deter any future hostile foreign leadership with access to strategic nuclear forces from acting against our vital interests and to convince it that seeking a nuclear advantage would be futile. In this regard, I consider the maintenance of a safe and reliable nuclear stockpile to be a supreme national interest of the United States."

The United States' policy governing the nuclear weapons stockpile has undergone profound change to reflect the new and continually evolving geopolitical and military structures of the post Cold War world. In the past, our confidence in the stockpile was ensured through weapons research and development at the laboratories, supported by an extensive production complex and underground nuclear testing at the Nevada Test Site. In 1992, the United States announced a halt in the production and design of new nuclear weapons and a moratorium on underground nuclear testing.

In 1993, President Clinton continued the moratorium on testing and initiated the Science-Based Stockpile Stewardship program when he challenged the Department "to explore other means of maintaining our confidence in the safety, reliability, and performance of our weapons." The challenge was also supported by Congress through passage of the fiscal year 1994 National Defense Authorization Act that directed the Secretary of Energy "to establish a stewardship program to ensure the preservation of the core intellectual and technical competencies of the United States in nuclear weapons.".

Last August, the President, emphasizing his continued support and confidence in science-based stockpile stewardship, announced that the United States would pursue a true zero yield Comprehensive Test Ban Treaty (CTBT) as a means of reducing the danger posed by nuclear.weapons proliferation. The President also outlined a series of Safeguards, A through F, that define the terms under which the U.S. would enter the CTBT. Safeguard A specifically directs the conduct of a stockpile stewardship program to ensure the safety and reliability of the stockpile. In January, the Senate gave overwhelming approval to the START II Treaty and declared that the United States "is committed to proceeding with a robust stockpile stewardship program * * *."

The Stockpile Stewardship and Management program, developed by Defense Programs in response to the above direction and policy guidance, is a highly integrated technical program for maintaining the safety and reliability of the U.S. nuclear stockpile. There are three primary goals of this program:

- Provide high confidence in the safety, security and reliability of the U.S. stockpile to ensure the effectiveness of the U.S. nuclear deterrent while simultaneously supporting U.S. arms control and nonproliferation policies.
- Provide an appropriately sized, affordable, environmentally sound,, and effective production complex to provide component and weapon replacements when needed, including limited lifetime components and tritium, and
- Provide the ability to resume U.S. nuclear testing and reconstitute nuclear weapon production capacities, consistent with Presidential Directives and the START II Treaty, should national security so demand in the future.

Traditionally, the activities of the three weapons laboratories and the Nevada Test Site have been regarded somewhat separately from those of the weapon production plants. However, all stockpile stewardship' and management activities must achieve a new, closer linkage to each other.

The Stewardship activities will play a major role in reducing the vulnerability of the smaller stockpile to single-point and common-mode failures, principally through research base support of the enhanced surveillance a new Stockpile Management initiative. The stewardship and management programs have shared responsibilities in advanced manufacturing and systems engineering studies to integrate technological drivers such as advanced computing into an efficient and effective production complex of the future. The Dual Revalidation program, managed by Stockpile Management, will encompass both laboratories and plants in a new joint process for validating the safety, reliability and performance of the stockpile over time. Finally, the Radiological/Nuclear Accident Response program, a Management function, continues to utilize capabilities !throughout the weapons complex, including weapons expertise at the laboratories and specialized capabilities at the Nevada Test Site.

The Stockpile Stewardship and Management Program will transform the nuclear weapons complex from capacity-based to capability-based. The future complex will rely more on scientific understanding, computer simulations, computer aided design, and manufacturing agility rather than test empiricism and manufacturing capacity. Having a surge capability for reconstituting a larger stockpile in an emergency could permit the United States to further reduce its active stockpile if international conditions so warrant. Continued interactions with the commercial industrial base, through technology partnering, can leverage our limited resources with industry capabilities to assist us with advanced manufacturing methods, improved materials development, and high speed, integrated computing and communication systems.

II. STOCKPILE STEWARDSHIP AND MANAGEMENT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

The national security policy changes over the last several years have not eliminated the need for any of the current or historical core competencies and capabilities at the weapons laboratories, industrial plants, or the Nevada Test Site. These competencies and capabilities must be maintained for the foreseeable future. Facilities in the current complex were sized to support a larger and more diverse weapons stockpile than will be required in the future and represent a capacity that exceeds our current need. On February 28,1996, the Department released the Draft Stockpile Stewardship and Management Programmatic Environment-I Impact Statement (PEIS) which will form the basis for the Department's transition to the capability-based complex of the future. The PEIS covers the future capabilities required of the three weapons laboratories (Los Alamos, Sandia and Lawrence Livermore) the four industrial plants (Kansas City, Pantex, Savannah River, and Oak Ridge Y–12) and the Nevada Test Site.

The Department's preferred alternative for stockpile stewardship proposes construction and operation of the National Ignition Facility and the Contained Firing Facility addition to the Flash X-Ray Facility at the Lawrence Livermore National Laboratory and the Atlas Facility at the Los Alamos National laboratory. All three facilities examine different aspects of weapons physics, key to understanding weapon safety and reliability. It should be noted that the Dual Axis Radiographic Hydrodynamic Test (DARHT), planned for Los Alamos National Laboratory, is another key facility in support of the stockpile stewardship program, but is considered as part of the no action alternative because an Environmental Impact Statement has been prepared for that facility and an independently justified Record of Decision has been made.

The Department's preferred alternative for stockpile management proposes to downsize in-place the following activities: weapons assembly/disassembly at Pantex; nonuclear component fabrication at the Kansas City plant; and secondary and case component fabrication at Oak Ridge (Y–12). Pit component fabrication is to be reestablished with a small production capacity at Los Alamos. At this time no preference has been established for high explosive component fabrication, but we will continue to examine this issue. For major stockpile management functions, downsizing at the current locations has a number of advantages. First, it minimizes the socioeconomic impact on the worker and communities surrounding the facilities. Second, it is the most cost effective solution. Finally, it lowers the technical risk and provides the needed flexibility to support potential variances in stockpile size under START I or START II.

While downsizing in place and the resulting decontamination and decommissioning activities will minimize the number of displaced workers, some job losses are inevitable. To-assist the workers and host communities, the Department will prepare workforce restructuring plans, as required by law and in consultation with our stakeholders, to mitigate job losses. The Department will conduct public hearings in Washington, D.C., and at each of the affected sites in March and April 1996. The comment period runs from March 8, 1996, to May 8, 1996. A final Environmental Impact Statement is scheduled for July followed by a Record of Decision in August 1996.

III. STOCKPILE MANAGEMENT ACTIVITIES

The Stockpile Management program continues its historical responsibilities to provide near term and long range support for the stockpile, and for ensuring an adequate supply of tritium. It also includes new programs and procedures to deal with the aging stockpile, a result of no requirement to build new weapons. Along with stockpile surveillance, the historical responsibilities include normal maintenance, corrective maintenance and system refurbishment as well as weapon dismantlement. The DOE has completed a separate Programmatic Environmental Impact Statement for tritium production, and is pursuing a dual-track approach to select a production method by 1998.

The current stockpile is safe, secure, and reliable. However, the history of the stockpile has shown that continuous surveillance, repair. and replacement of components and subsystems are commonplace. In fact, the nine weapons that will be in the START II stockpile have already been retrofitted to varying degrees and some have had major components of the nuclear system replaced. We cannot predict with any certainty when such problems will arise in the future, but we expect that as the stockpile ages beyond its intended lifetime, these types of problems may become more commonplace.

An enhanced surveillance program has been initiated to better predict weapon components failure, due to aging, in order to allow refurbishment of the stockpile. We are looking at new methods for manufacture that will provide more efficient realization of products with waste-stream minimization. Our maintenance program not only deals with ongoing weapon upgrades and modifications, but also with the routine need to exchange limited-life components like tritium reservoirs and neutron generators.

Several new programs have started focusing on weapon evaluation, such as dual revalidation of the W76 warhead 'in the Trident and the new requirement of the President for annual certification of the stockpile. Finally, our emergency response program is ready in the event of a nuclear incident or accident. This program conducts several exercises annually, at various levels, to maintain its response capability.

Surveillance

Ongoing surveillance is vital to the continuing viability of the stockpile. These activities support the entire weapons stockpile in the quantities authorized by the Nuclear Weapons Stockpile Plan. Surveillance is conducted by inspecting a statistically significant number of each weapon type drawn from the stockpile annually, tearing them down, testing the components, and, in most cases, rebuilding them and placing them back into the stockpile. A few of these weapons are tested to destruction. A selected number of flight tests with simulated nuclear components are also performed annually. This process requires that the tested weapons that are rebuilt are reassembled from components that were originally manufactured or stockpiled when the weapon was being produced. In some cases, we expect to run out of new components and will have to substitute replacement components or otherwise determine how to rebuild them.

The surveillance program historically has been successful in discovering weapons defects. We expect that it will continue to find between one and two defect types per year, which will require some degree of augmented maintenance. We are currently testing pits (Los Alamos), secondaries (Y–12), neutron generators (Sandia), detonators (nuclear design laboratories), gas reservoirs (Savannah River), and non-nuclear components (Kansas City), in addition to the main line disassembly activity ongoing at Pantex.

Maintaining the Stockpile

Maintaining the stockpile has become a program which will provide for indefinite life extension. Before the end of the Cold War, the average life of all weapons in the stockpile never exceeded 13 years, also the current average, and weapons rarely remained in the stockpile beyond 30 years. With no new weapons planned, weapons will soon begin to approach an age beyond our experience base. DOE must continue to supply hardware for Limited Life Component Exchanges (LLCEs), provide hardware to support ongoing and approved future refurbishment through the Stockpile Life Extension Program (SLEP), and provide hardware to prevent attrition of the stockpile by the surveillance program. In addition, we must continue to meet the stockpile requirements for Field Service, logistics support functions, and dismantlement and storage.

With weapons being retained in the stockpile for an indefinite period, individual weapon parts could eventually reach the limit of their reliable lifetime and may require refurbishment or replacement. Thus, design, production, and refurbishment capabilities must be structured to respond to the requirements of the SLEP. Near-term scheduled deliverables supporting the stockpile include: LLCE (tritium reservoir and replacement activities), stockpile refurbishment (B61 Alterations, B83 quality improvement program, W76 neutron generators, W87 life extension program), surveillance rebuilds (W88 pit), and the capability to design and develop changes to existing warheads and components (warhead protection program, common radar for 0611083 and new tritium reservoir for W76).

Dual Revalidation

Dual Revalidation is a new, robust form of peer review designed to assure both DOE and DOD that the stockpile remains safe, secure and reliable. The Dual Revalidation Program was approved by the Nuclear Weapons Council (NWC) in January 1996. In the absence of underground nuclear testing and with no new warhead development, this new process will validate, with high confidence, that the stockpile will continue to meet its specifications for Military Characteristics (MCs) and Stockpile-to-Target Sequence (STS).

Under Dual Revalidation, two teams will perform independent evaluations, the first team drawn from the original design laboratory the second team from the alternate laboratory. Dual Revalidation will provide a baseline assessment of the condition of the warhead today and a process to identify future problems. The evaluation will be managed by the joint DOD/DOE Project Officers Group and is expected to take 2–3 years for each warhead type. The W76 will be the first warhead revalidated. The increased DOD involvement in and technical understanding of the assessment should provide them with the confidence in the stockpile previously supplied by nuclear testing.

New Annual Certification Procedure

A primary DOE responsibility is to certify the safety and reliability of the Nation's nuclear stockpile. As a result of the President's August 11, 1995, announcement, there is a new annual reporting and certification requirement, requiring the Secretaries of DOD and DOE, as advised by NWC, the Commander of the U.S. Strategic Command, and the Directors of DOE's Nuclear Weapons Laboratories, to provide an annual certification that the stockpile is safe and reliable in the absence of nuclear testing. A broad-based review of ongoing efforts and existing documentation will be conducted each year; it is not intended as justification for any new program(s). All active and inactive weapon types will be considered by the weapons laboratory responsible for the original design and the DOD-led joint Project Officers Group. This effort is intended to assure the President that' nuclear weapons are safe and reliable as we continue on the path to a true zero yield CTBT. We expect to submit the first annual report to the Secretaries of Energy and Defense in August 1996.

Enhanced Surveillance Program

Enhanced surveillance is an essential development program for stockpile management. The program was finalized in the first quarter of fiscal year 1996 and the development effort was initiated in the second quarter. It is the critical element of the SLEP and uses advanced science to predict component and material lifetimes. The enhanced surveillance program is a complex-wide integrated program involving the four production plants and the three weapons laboratories and is central to restructuring our stockpile maintenance and refurbishment procedures in an era without underground nuclear testing and no new production.

To accomplish this effort, enhanced surveillance will focus on three major areas: 1) materials science, 2) development of materials aging models, and 3) testing and monitoring technologies. This program will develop models which will account for aging effects in weapons materials, components, and systems that will help us to predict service lifetimes and to schedule ,with the DOD, necessary component replacement. Because the stockpile of the future will be smaller and less diverse, we must proactively identify and repair components before they fail (due to aging effects) to ensure the maintenance of a credible stockpile. This will have the effect of making all weapons components subject to time-phased replacement with lifetimes varying widely, for example, metal versus plastics. The advanced diagnostic and testing techniques developed in this program will collect information that not only supports our model development, but advances our knowledge of the behavior of these complicated materials and components over time. It is anticipated that diagnostic instruments may be required that can be placed in a weapons system to monitor critical components in real time.

The surveillance techniques, procedures, and models developed in this program will be incorporated into the ongoing core surveillance program when we are confident of their validity. With these new tools, our program of stockpile maintenance will be in a genuinely predictive mode.

Advanced Manufacturing Capabilities

Advanced Design and Production Technologies (ADAPT) is an initiative to coordinate and focus the activities of the laboratories and weapons plants in the creation of a reconfigured and rightsized production capability. It will be a necessary element to tie surveillance activities to future manufacturing capabilities. ADAPT will exploit emerging information and manufacturing technologies to better integrate the nuclear weapons complex and will develop modular, scalable,environmentally sound manufacturing processes needed for maintenance of a reliable stockpile under a wide range of demands. Current ADAPT work is concentrated on planning and evaluation of current advanced manufacturing activities in the plants and laboratories.

Transportation of Special Nuclear Materials

The transportation of special nuclear materials has become an increasingly important element of stockpile management as a result of both dismantlement and the restructuring and consolidation of military bases in the United States. The Department provides for the transportation of special nuclear materials, nuclear weapons, and weapons components throughout the continental United States via specially designed safe, secure tractors and trailers (SST's).

The Department has accumulated more than 83 million miles of over-the-road experience with no accidents causing a fatality or release of radioactive materials, and without damage or compromise of the cargo. Much of this can be attributed to the well managed, highly trained, competent, and dedicated work force of more than 260 couriers with nationwide secure communications. In addition, largely due to our specialized in-house training capability, the nuclear material couriers are one of the most highly effective protective forces in the world. Seventeen new trailers called Safe Guard Transporters (SGT), incorporating the latest advances in materials and transportation technology, are currently being built to keep the overall system best in class.

Dismantlement

Since the end of World War II, the Department and its predecessors have disassembled some 55,000 nuclear warheads in a safe, secure, and an efficient manner. During the last fiscal year, 1,393 weapons were safely dismantled at the Pantex Plant. Since the beginning of the current fiscal year we have dismantled 545 warheads, and expect to complete the fiscal year 1996 total goal of 1,164. We are on schedule to complete the W48, B61 mod 0, and W70 dismantlement lines and start up the B61 mod 2 and W69 dismantlement lines.

In fiscal year 1997, we expect to dismantle about 1,300 nuclear weapons and will complete the W55 and B61 mod 2 dismantlement lines and start the W56, B61 mod 5, and W79 lines. The planned dismantlements should eliminate the backlog of retired weapons by fiscal year 1999 and supports DOD activities. The Pantex workload is expected to remain stable for the next several years as we reduce the nuclear stockpile consistent with our arms control commitments.

Emergency Response

The Emergency Response program is the U.S. Government's singular national capability to provide the critical technical expertise necessary to resolve any major radiological emergency or nuclear accident within the United States and abroad. Its intimate association with the nuclear weapon complex allows us to capitalize on weapon program core activities in both the areas of stockpile stewardship and management. The all-volunteer force that make up the cadre of deployment forces are mostly from the core weapons program.

Not withstanding the Department's pursuit of both the dismantlement program and our commitment to ensuring a safe, secure, and reliable stockpile, we must have the necessary plans in place to provide a rapid response in the event of a nuclear weapon accident. While the occurrence is extremely unlikely, we are prepared to effectively mitigate the consequences of an accident. We are in the initial planning stages for a full field training exercise, where DOE will be in charge of command and control as well as provide the technical expertise necessary to resolve the accident. This exercise is scheduled for mid–1997.

Further, as result of the breakup of the Soviet Union and our aggressive stance to curb the development of weapons of mass destruction, the Department plays a vitally important support role in combating acts of nuclear terrorism, through its Nuclear Emergency Search Team (NEST). NEST provides the operational and technical expertise to the Federal Bureau of Investigation in the United States, and supports the State Department in a similar manner overseas. We have vigorously pursued bringing the program up to present day standards necessary, based on the available intelligence, to counter the current nuclear threat and trends in these activities. Our present and near-term activities include continuance of a rigorous training program and pursuing improved search, device assessment and disablement capabilities.

Tritium Supply

An integral part of ensuring confidence in the stockpile is providing an adequate supply of tritium, a radioactive gas required for all U.S. nuclear weapons to operate as designed. Tritium, with a half life of 12.3 years, decays at a rate of 5.5 percent per annum. To meet current stockpile requirements, the Department is recycling tritium from dismantled weapons. A new tritium production source will be needed by the year 2005 to maintain the START I stockpile, and the associated 5-year tritium reserve, until full ratification and entry into force of the START II Agreement. The current supply of tritium is sufficient to meet the START II stockpile, and the associated 5 year tritium reserve, until 2011, as given in last year's testimony.

Last year, the Department completed work on the Tritium Supply and Recycling Programmatic Environmental Impact Statement. On December 6,1995, the Secretary issued the Record of Decision in which the Department outlined a dual track strategy for assuring a safe, reliable source of tritium to meet national security requirements. One track will investigate the purchase of a commercial reactor or irradiation services. The other track will develop and test accelerator production of tritium. The Department has requested $100 million in the fiscal year 1997 budget to pursue both alternatives. By 1998, one of these alternatives will be selected to become the primary tritium production method. The other, if determined to be feasible and practical, could become an assured backup capability.

There are no difficult technical issues associated with the production of tritium in a light water reactor but there are regulatory and licensing uncertainties. Tritium producing targets for use in light water reactors were developed and tested several years ago but work on the target development program was suspended by Congress in 1992. During the past several months, the Department has revived this effort. While additional target qualification studies are needed to support regulatory and owner approval for their use in commercial reactors, the work already accomplished has demonstrated that the target will work extremely well in light water reactors.

Recently, the Department invited expressions of interest from electric utility companies owning commercial nuclear facilities to determine their preliminary level of interest in either selling a reactor or irradiation services to the Department for tritium production. The response to that invitation has been very encouraging, and we will soon be developing a formal solicitation of proposals for the sale of facilities or services to the Department to make tritium. In addition, within the next few weeks, the Department and the Nuclear Regulatory Commission (NRC) will conclude the development of a Memorandum of Understanding governing the interaction between the two agencies for target qualification and NRC reactor licensing activities.

Technical activities in fiscal year 1997 for the commercial reactor approach will include target testing to support qualification, target fabrication demonstrations to support target procurement, and extraction process development to support construction and upgrade of the Savannah River tritium facilities. Initial confirmatory target testing in commercial reactors is planned for late fiscal year 1997 as is the conditional selection of a reactor or reactors which the Department would use to meet tritium requirements.

The accelerator alternative has comparatively minor nonproliferation and regulatory concerns and requires no technological breakthroughs. However, several features and portions of the technology need to be demonstrated at production power levels. The design choices (e.g. proton energy, power requirements, size of the plant, and accelerator components) will only affect the cost, reliability, and maintainability of the system. The project includes a development effort to select between technical alternatives, testing to establish performance and reliability, and the use of industry for conceptual and engineering design and, if built, construction. These efforts will narrow the cost uncertainty range. The Savannah River Site will be the location of the accelerator if a decision is made to proceed with construction.

Accelerator production of tritium activities in fiscal year 1997 will focus on developmental engineering and component qualification to establish baseline design of the accelerator components. Most of these activities will be done by or under the technical direction of Los Alamos National Laboratory. During this year, the prime contractor for the APT production facility will complete a Conceptual Design Report (CDR), which will establish baseline design and greatly narrow the cost uncertainty. This report would also provide a basis for requesting approval to begin engineering design in fiscal year 1998.

IV. STOCKPILE STEWARDSHIP

In the past, nuclear testing filled the gaps in the basic understanding of complex physics phenomena and provided high confidence in the certification of nuclear safety and performance. Existing tools which were used in conjunction with nuclear testing are inadequate if used alone. Assessment of stockpile problems and certification of repairs or replacements of nuclear components in the future will have to rely on improvements to these tools. Science-based stockpile stewardship will focus on obtaining more accurate and complete scientific understanding and experimental data, developing advanced computer simulations, and validating new tools using past nuclear data and new experimental data.

The key to the success of the Stockpile Stewardship and Management Program are the three weapons laboratories and their core intellectual and technical competencies. On September 25, 1995, President Clinton concluded that the "vitality of all three DOE nuclear weapons laboratories [is] essential and directed DOE to maintain nuclear weapons responsibilities and capabilities adequate to support science-based stockpile stewardship." The competencies of the weapons laboratories embody more than 50 years of knowledge and experience that cannot be found anywhere else in the United States. The science and engineering technology base at the laboratories is responsible for meeting all technical requirements for U.S. nuclear weapons. The personnel at these laboratories currently perform the basic research, design, system engineering, development testing, reliability assessment, and certification of nuclear performance using existing experimental facilities and computational capabilities. In addition, they determine and control all technical specifications that are used by the industrial base for manufacturing and surveillance operations and for maintenance operations conducted by DOD. Data from these operations is provided to the weapon laboratories for assessment and technical resolution of performance and safety problems.

Because there is no absolute guarantee that the initiatives discussed below will provide the capabilities to ensure the safety and security of the stockpile without underground nuclear testing, the United States will maintain the capability to conduct nuclear testing at the Nevada Test Site (NTS). The Department will also maintain the necessary technical capabilities at the weapons laboratories to design and conduct such tests.

Advanced Experimental Capabilities

The National Ignition Facility (NIF) is being designed to produce, for the first time in a laboratory setting, conditions of temperature and density of matter close to those that occur in the detonation of nuclear weapons. The NIF's 192 beam laser with 50 times more energy than any existing laser is intended to be capable of compressing a tiny capsule of hydrogen isotopes to pressures 100 billion times earth's atmosphere and at temperatures hotter than the center of the sun. Nuclear fusion, that occurs in stars and weapons, is predicted to occur in the tiny NIF target. The ability to study the behavior of matter and the transfer of energy and radiation under these conditions is key to understanding the basic physics of nuclear weapons and predicting their performance without underground nuclear testing. Experiments at the NIF could test the validity of computer-based predictions and demonstrate how aged or changed materials in weapons could behave under these unique conditions. The challenges and research opportunities at the NIF would attract world-class scientists and engineers, thus help ensure that the Nation's national security challenges could be addressed by laboratory experts second to none.

Recently, the inertial confinement fusion program and its technical basis for the NIF were favorably reviewed by the Inertial Confinement Fusion Advisory Committee, and the relationship between stockpile stewardship and the NIF was specifically and positively endorsed by the JASONs. During the past year, the Office of Arms Control and Nonproliferation of DOE completed public hearings and a thorough study on the "Issue of the NIF and Nonproliferation". In December 1995 Secretary O'Leary determined that the construction of the NIF supports the nuclear nonproliferation objectives of the United States.

Construction of the NIF is part of the stockpile stewardship preferred alternative in the recently released Draft PEIS for Stockpile Stewardship and Management. The environmental analysis concerning NIF in the final PEIS will be sufficient for approving its construction and operation. The final decision on location of the NIF will not occur until the Record of Decision later this summer.

Title I design activity is now underway and will provide cost estimates on the project baseline in the fall of 1996. The fiscal year 1997 budget request of $191 million will provide funds to prepare an industrial component fabrication capability and to complete Title II, site-specific, detailed construction design. This work will provide the basis for a construction decision by the administration in mid-1997.

Current hydrodynamic testing facilities, the Pulsed High Explosive Radiographic Machine Emitting X-rays (PHERMEX) at the Los Alamos National Laboratory (LANL) and the Flash X-Ray facility (FXR) at Lawrence Livermore National Laboratory (LLNL), were adequate to meet the challenges of stockpile stewardship in conjunction with nuclear testing. In the absence of nuclear testing, however, more capable hydrodynamic testing facilities will be required. The Dual Axis Radiographic Hydrodynamic Test facility (DARHT) planned for construction at LANL is the first such facility. Through its dual-axis, multi-time viewing capability, it will provide crucial experimental data on many of the systems in the stockpile and hence will directly support performance and safety revalidation, enhanced surveillance, and an improved predictive capability. Furthermore as the most capable hydrodynamic testing facility in the complex, DARHT will play a central role in developing advanced technologies for a next-generation Advanced Hydro test Facility.

Construction of DARHT was enjoined by a Federal Court order in January 1995, pending completion and judicial review of an Environmental Impact Statement (EIS) and associated Record of Decision (ROD). The EIS was completed in August 1995 and the ROD issued in October 1995. A motion to dissolve the injunction was filed subsequently by the Department of Justice, but the issue remains before the court at this time. The ROD states the Department's intention to finish the facility using new and improved technology as appropriate, and also directs implementation of a phased containment process to reduce by 75 percent the environmental emissions from radiographic hydro testing. The Department, in conjunction with the Department of Justice, has supported this project through the thorough and accelerated completion of the EIS, release of an unclassified environmental impact summary developed from certain classified matter, and an expedited response to the Federal Court's clearance request for three of its staff.

The Atlas facility to be located at Los Alamos National Laboratory is also included in the list of new experimental capabilities. The facility provides a pulse power experimental capability to address secondary weapons physics in an energy rich, high energy density environment. The fiscal year 1997 budget includes $15M to allow construction to begin in mid-fiscal year 1997.

The Los Alamos Neutron Science Center (LANSCE), while not a new facility, is the most powerful neutron research facility in the world, providing an intense source of pulsed neutrons for experiments supporting national security and civilian research. Neutrons are unique and valuable probes of matter on scales ranging from the subatomic to complex materials. At low energies, neutrons are used to study many critical weapons materials issues. At higher energies, neutrons probe the small-scale structure of atomic nuclei, which is important for studies of nuclear weapons processes. At the very highest energies, neutrons can penetrate very thick materials providing unique surveillance capabilities.

LANSCE now has in place a substantial program focused on its key mission in stockpile stewardship. The program is divided into five projects: Advanced Radiography, Weapons Materials, Weapons Nuclear Physics, High-Explosives Characterization, and Weapons Design Physics.

Advanced Computer Capabilities

The Accelerated Strategic Computing Initiative (ASCI) is a major part of Defense Program's response to Presidential decisions to halt nuclear weapons tests and pursue a zero-yield Comprehensive Test Ban Treaty. ASCI is designed as a balanced program to accelerate the development of nuclear weapons simulation codes, scientific understanding of weapon behavior, advanced computer platforms, and computing environments and infrastructure. These advances are essential for addressing the challenges of creating the only credible integrated test bed alternative to nuclear testing by using simulations for investigating performance, safety, and reliability of weapons in the nuclear stockpile.

ASCI will build on the core stockpile computing program at the weapons laboratories to develop the applications, computers, and simulation capability for integrated device assessments, and a predictive aging capability to enable a focus on extending the lifetime of the current stockpile. ASCI will work closely with the U.S. computer industry to accelerate companies' technology plans to provide computer systems that far exceed current industry predictions, but ones which are absolutely essential for stockpile stewardship success. ASCI will also engage U.S. universities to work on problems that are critical to physics, materials modeling, and computer science issues that are needed to support the ASCI simulation capabilities.

The simulation of nuclear weapons requires a weapon applications capability improvement of 10,000 to 100,000 times more than the current design capability. ASCI will create multiple industrial research partnerships to accelerate current performance trends in supercomputers. It is not possible to predict which technology path will lead to the best results; indeed, it is unlikely that a single technical approach will serve all application needs. Therefore, the research partnerships must overlap both in time and in technical approach in order to achieve a high payoff with manageable risk, ensure flexibility, and provide a diversity of technical approaches. To accelerate development of computer hardware, software, and communications, an aggressive, integrated, and sustained approach is required which accelerates important computer technology including: advancing the availability of very high performance computers—systems capable of 100's of Teraops (trillions of scientific operations per second), high speed interconnect and encrypted links, and distributed high performance computing (HPC) environments.

ASCI is well underway. In fiscal year 1996, ASCI funded 11 new code or constituent model start-up efforts. Four of these code starts focus directly on increasing the ability of laboratories to predict the integrated performance and safety of weapons through computational means. On August 22, 1995, the Secretary announced the Defense Programs procurement of the world's fastest computer to be delivered to Sandia National Laboratory in December 1996. This computer will run at more than one trillion operations per second and will be dedicated to solving difficult weapons problems. On February 20, 1996, the Department, through Los Alamos and Lawrence Livermore National Laboratories, announced a competition for a follow-on system that will explore a different architecture and will run at three trillion operations per second. In order to support collaboration among ASCI researchers at the three laboratories, the first secure high-speed data network linking the Los Alamos, Sandia and Lawrence Livermore National Laboratories was established on October 20, 1995.

The ASCI program will continue to advance during fiscal year 1997. Significant efforts will be required to continue the development of the codes started in fiscal year 1996. The development plans for these codes include the delivery of initial capabilities needed to certify planned near-term stockpile modifications (e.g. W76 recertification, W88 pit rebuild, and B61 Mod 11.) The development of these codes also requires a significant interface with Defense Programs experimental facilities for verification and validation. Fiscal year 1997 will also see the delivery of the one trillion operations per second computer at Sandia and two development systems for the three trillion operations per second computer at Los Alamos and Lawrence Livermore. Significant modeling, software, and infrastructure work will be required to enable weapons code development and simulation on those computers. The fiscal year 1997 budget requests $122 million for ASCI.

The ASCI can and should proceed rapidly. It will provide continual improvement to our assessment and certification tools in the core stockpile computing and modeling program. For example, recently developed 3–D computer models that can now begin to interpret the complex fluid instabilities near special weapon features, provided essential data on design changes to the W–87 warhead. This data was a significant factor in allowing us to proceed without testing.

Test Readiness

President Clinton has directed the Department to maintain a basic capability to resume nuclear testing activities at the Nevada Test Site (Safeguard C) should the United States deem it necessary. One of the ways the Department will retain this capability is to conduct, over the next several years, a series of subcritical experiments with nuclear materials at the Nevada Test Site. Two subcritical experiments are planned for fiscal year 1996 and four for fiscal year 1997.

Subcritical experiments use high explosives to create some of the physical conditions, such as pressure and temperature, under which nuclear materials function in a nuclear weapon. These experiments will provide an improved understanding of certain dynamic material properties of plutonium essential for assessing nuclear warhead performance, reliability, and safety. Subcritical experiments will help the U.S. monitor the aging nuclear weapons stockpile, and assist in developing our computational and modeling capabilities by providing essential experimental data on the performance of aging warhead components.

Above ground experimental programs, conducted at the weapons laboratories as a part of the Stockpile Stewardship and Management Program, also contribute to readiness in a variety of ways. This includes experiment planning and pretest preparations, the conduct of the experiments, and reduction and interpretation of postshot data. of special importance to test readiness is the area of diagnostics and data acquisition. including the continued development of sensors, recording instrumentation, and data interpretation techniques.

The Nevada Test Site is planning training exercises to practice the skills and functions necessary for nuclear testing which are not involved in either the subcritical experiments or the high explosives experiments which take place at the site. To further preserve a nuclear testing capability at the test site. the processes necessary for conducting nuclear tests are being carefully archived. A core roster of experienced retirees, which could be called up if testing were to be resumed, is also being compiled. The fiscal year 1997 budget has requested $164 million to support Nevada Test Site readiness.

V. FISCAL YEAR 1997 BUDGET SUMMARY

The following table creaks out the fiscal year 1997 budget requirements for Defense Programs in the Weapons Activities appropriations account. The request of $3.7 billion, reflecting our total obligational authority requirements, is allocated among three major program areas: Stockpile Management ($1.8 billion); Stockpile Stewardship ($1.6 billion); and Program Direction ($0.3 billion). This latter account provides the Federal salaries and related administrative expenses to manage the Stockpile Stewardship and Management Program.

DEFENSE PROGRAMS—FISCAL YEAR 1997 CONGRESSIONAL BUDGET

[In millions of dollars]

	Adjusted fiscal year 1995	Adjusted fiscal year 1996	Proposed fiscal year 1997
Stockpile Management:			
Base Stockpile Management	1,438	1,599	1,496
Tritium Supply		75	100
Enhanced Surveillance Program		18	40

DEFENSE PROGRAMS—FISCAL YEAR 1997 CONGRESSIONAL BUDGET—Continued

[In millions of dollars]

	Adjusted fiscal year 1995	Adjusted fiscal year 1996	Proposed fiscal year 1997
Radiological/Nucl. Accident Response	69	71	80
Special Nuclear Materials—Surveillance	80	81	83
Subtotal: Stockpile Management	1,587	1,844	1,799
Stockpile Stewardship:			
Base Stockpile Stewardship	968	1,008	1,041
Nevada Test Site Readiness	200	183	164
National Ignition Facility	6	61	191
Accel. Strategic Computing Initiative	....	85	122
Education	20	10	10
Technology Transfer	214	149	49
Subtotal: Stockpile Stewardship	1,408	1,496	1,577
Weapons Program Direction	365	327	334
Total Directed Program	3,360	3,667	3,710
Use of Prior Year Balances	−148	....	
	−211		
New Obligational Authority	3,212	3,456	3,710

VI. CONCLUSION

The purpose of the Stockpile Stewardship and Management Program is to ensure the safety and reliability of the nuclear weapons stockpile, without underground testing. Our strategy is based upon a stockpile life extension program that treats each component of each weapons as a limited life component; a dual track approach to ensure a supply of tritium, assessment and certification procedures based upon previous tests; a more detailed scientific understanding of weapon processes and advanced computation; and a downsized, but modernized and flexible production complex. We believe this strategy best fits the nuclear requirements for the post Cold War era, balancing support for the current stockpile with the research needs for extending stockpile life and maintaining the vitality of the research, production, and testing team.

Senator KEMPTHORNE. Dr. Reis, thank you very much.

Isn't it ironic that we are talking about quality assurance of mechanical things and our microphones do not work.

Dr. REIS. We are having the same problem hearing you. Maybe we should get our stewardship program to work on this for you. [General laughter]

Senator KEMPTHORNE. Let me now call on Dr. Harold Smith who is the assistant to the Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs at the Department of Energy.

Dr. Smith, welcome. We are glad to have you back.

STATEMENT OF DR. HAROLD P. SMITH, ASSISTANT TO THE SECRETARY OF DEFENSE FOR NUCLEAR AND CHEMICAL AND BIOLOGICAL DEFENSE PROGRAMS, DEPARTMENT OF DEFENSE

Dr. SMITH. Thank you, Senator. I hope this microphone works. No, I see that it does not.

Senator KEMPTHORNE. None of the microphones are working right now. We have asked the electrical people to come up to check on them for us. So please just speak as loudly as you can.

Dr. SMITH. I will use my command voice, Mr. Chairman.

Senator KEMPTHORNE. Can everyone hear in the back? Let's hope so.

Dr. SMITH. Mr. Chairman, I appreciate the opportunity to present the Department of Defense's opinion on the budget and plans of the Department of Energy.

Senator KEMPTHORNE. Why don't we just abandon the microphones for the time being.

Dr. Smith, aside from the mechanical problems, we look forward to your comments.

Dr. SMITH. Mr. Chairman, may I submit my written statement for the record.

Senator KEMPTHORNE. Yes, you may. In fact, all of your written statements will be made a part of the record.

Dr. SMITH. I will make a few brief comments based on that testimony.

First of all, the Department of Defense finds the nuclear stockpile to be safe, secure, and reliable today. Furthermore, it meets the requirements set forth by the Department of Defense.

The question that you have asked, sir, is will it remain so, particularly without tests. The answer there is yes, and an important aspect of that is that DOD is quite content with a static arsenal. That is, we are not asking in the foreseeable future for any new or vastly changed weapons other than what are in the arsenal today.

Maintenance of a static arsenal without test is feasible. Maintenance of a new arsenal without test is infeasible. That is an important point that I want to emphasize here.

How can I be so confident that we can maintain this arsenal? We will do it jointly with our colleagues in Energy through an adequate budget, thorough planning and steady effort. These, as you can see from testimony last year and today, are underway. This is not a plan; it is actually a program that is being implemented.

Most important, though, is the sense expressed by General Joulwan of one team/one fight.

I have the pleasure of chairing the Standing Committee that supports the Nuclear Weapons Council, which is, by law, the legislative organ for bringing together the interface between the Department of Energy and the Department of Defense.

On the Standing Committee, we have representatives from my office, the Strategic Command, Army, Navy, Air Force, and appropriate components of DOE. It is up to that committee and the Nuclear Weapons Council to adjudicate, assign, plan, and program for the efforts that must be undertaken if we are to maintain the arsenal that we have today.

I would like to give just a few examples of how one team/one fight is doing the job. The first has been covered in detail; that is, the production of tritium. We are on a dual track in which the two tracks are quite different in the risks that are imposed upon them. The first track is to use radiation services which are fraught with legal difficulties from established reactors. I leave to my colleague, Dr. Curtis, an eminent lawyer, those legal problems, which I am sure he will solve, and there will be no further questions there.

The other unfortunately comes upon people of my bent, which is the engineering side. The accelerator production of tritium does have technical risk. But the two together, which the Department of Energy is quite properly pursuing, should mean that we will have the necessary tritium, as I reported earlier this morning.

A second example is dual revalidation. Secretary O'Leary has decided to retain the Lawrence Livermore Laboratory and the Los Alamos Laboratory as our weapons design centers of excellence. That means that we have available to us independent reports by the culturally and geographically separated laboratories on the status of each one of the weapon types in the arsenal.

Those reports, which will be thorough, will be augmented by additional above-ground testing. They will use archive data; and they will, most importantly, be presented to my office unabridged and independent, so that the Department of Defense will have the ability to draw its own conclusions on the status of each of the weapons in the stockpile.

More than this, we have already implemented a shoulder-to-shoulder approach. Members of the Department of Defense are already working side-by-side with the design laboratories and Sandia Labs to make sure that we develop on our side of the river the arcane expertise to judge the validity of the reports regarding the status of the stockpile.

Another example is the Nuclear Weapons Stockpile Memorandum, which, as I reported earlier, is a dual-track memorandum in order to take advantage of the kind of world we would like to see, as exemplified by START II, or the kind of world we have to plan for, as exemplified by START I.

Secretary Curtis was quite correct in quoting Dr. Perry, who said quite clearly that we will not pursue the START II strategy with regard to the stockpile until the START II Treaty has entered into force—that is, well beyond just ratification by Russia.

It was not easy to develop a dual-track stockpile memorandum, but it has been done and we are very pleased with the results.

A final example, Mr. Chairman, is the Standing Committee of the Nuclear Weapons Council has recently reviewed the capability of DOE to remanufacture the most delicate part of the nuclear weapon; that is, the so-called pit or the primary of the weapon. The Council and its Standing Committee are satisfied that we are on the track to be able to remanufacture all parts of a nuclear weapon.

This is a key point because it will be observed that we are asking these weapons to last indefinitely. Of course, they cannot last indefinitely. The point is to recognize when they are deteriorating and to have the ability to remanufacture at that point.

I think we have succeeded working as one team/one fight to develop the plan which will allow us to see the deterioration and to have the remanufacturing capability to take the necessary action.

In short, the Department of Energy and the Department of Defense are collectively, collegially, effectively responding to the challenge of maintaining a static nuclear arsenal without benefit of underground testing.

With that, sir, I would like to conclude my comments and look forward to your questions.

[The prepared statement of Dr. Smith follows:]

PREPARED STATEMENT BY DR. HAROLD P. SMITH, JR.

Mr. Chairman and members of the Subcommittee. I am honored to have this opportunity to appear before you. I will begin by stating that, today, the stockpile is safe, secure, and reliable. My remarks will focus on the shared responsibility between the Department of Defense (DOD) and the Department of Energy (DOE) to assure high confidence in the Nation's nuclear stockpile. This responsibility presents a new challenge because the nuclear weapons in our stockpile will be retained well beyond their intended design lifetimes without the benefit of underground nuclear testing.

The President recognized this challenge for the nuclear weapons program in his August 11, 1995 speech announcing the U.S. position on a zero yield Comprehensive Test Ban Treaty (CTBT): "In order for this program to succeed, both the administration and the Congress must provide sustained bipartisan support for the stockpile stewardship program over the next decade and beyond. I am committed to working with the Congress to ensure this support." The President further directed a new annual certification to assure the safety and reliability of the nuclear stockpile. Finally, he stated that he would be prepared to "exercise our supreme national interest rights under the CTBT in order to conduct whatever testing might be required" if a high level of confidence in the safety or reliability of a nuclear weapon type critical to our deterrent could no longer be certified. With this challenge and commitment in mind. I will review some of the changes in the nuclear weapons program and actions that are being taken to ensure that we—and our potential enemies—continue to have high confidence in the stockpile.

The end of the cold war has wrought significant changes in the nuclear weapons program. Over the last decade. there has been an unprecedented shift in emphasis from design, development, fabrication, and testing of new warheads to refurbishment and life extension of existing warheads. Our stockpile has been reduced in size and diversity of weapon types and, by the end of this fiscal year, the current inventory will become the oldest in U.S. history. Today, we do not have the capability to manufacture replacements for the nuclear warheads that comprise our existing stockpile. We must comply with environmental requirements that are increasingly challenging and litigious. The extended underground test moratorium has evolved into a U.S. position for a zero yield CTBT. Finally, without the traditional yardstick of underground testing it will become ever more difficult to replace the shrinking cadre of nuclear weapons experts. These changes have forced a shift in strategy at the Departments of Defense and Energy and were addressed in the DOD's Nuclear Posture Review.

THE NUCLEAR POSTURE REVIEW

Approved by the President in September 1994, the Nuclear Posture Review (NPR) continues to provide the DOD policy guidance, force structure, and stewardship obligations for the enduring nuclear weapons stockpile. The NPR codified the National policy of "lead and hedge" as our approach to nuclear weapons and the attendant technology infrastructures. The policy of "lead and hedge"' simply means that the U.S. will "lead" strategic arms control efforts toward START II or smaller force levels, but retain the ability to "hedge" by returning to START I levels.

Although primarily a DOD document, the NPR contains infrastructure requirements for the Department of Energy to ensure high confidence in the enduring stockpile. namely:

- —Maintain nuclear weapon capability without underground testing or the production of fissile material:
    - —Develop a stockpile surveillance engineering base;
    - —Demonstrate the capability to refabricate and certify weapon types in the enduring stockpile;
    - —Maintain the capability to design, fabricate, and certify new warheads;
    - —Maintain a science and technology base;
- —Ensure tritium availability; and
- —Accomplish these tasks with no new-design nuclear warhead production.

To meet these requirements, we must provide an environment for the development of nuclear experts who can meet tomorrow's ever increasing challenges. The DOE, with assistance from the DOD, is pursuing a Stockpile Stewardship and Management Program to meet NPR requirements.

THE STOCKPILE STEWARDSHIP AND MANAGEMENT PROGRAM (SSMP)

As DOE continues to address NPR infrastructure requirements, the SSMP will provide a structured approach to deal with the lack of underground testing and no new nuclear weapon production. In the past, underground nuclear testing was the ultimate arbiter of the stockpile. Absent this arbiter, the DOE must develop new approaches to ensure high confidence in our nuclear deterrent. The SSMP must include: (1) enhanced surveillance of the stockpile, (2) expanded computational capability such as the Accelerated Strategic Computing Initiative (ASCI), (3) above ground experimental facilities (AGEX), (4) subcritical plutonium experiments at the Nevada Test Site and the ability to return to underground testing, (5) a limited capacity to remanufacture warheads in the existing stockpile, and (6) an assured source for tritium.

The DOD is satisfied with the progress that is being made by the DOE to fulfill its responsibilities as delineated in the NPR, but much remains to be done. For example, the Nuclear Weapons Council (NWC) endorses the DOE's dual track approach of pursuing a commercial light water reactor and accelerator produced tritium (APT) sources, but both approaches must overcome technical and institutional challenges. In the case of warhead fabrication, we must first establish a baseline capacity to replace those warheads routinely consumed by the quality assurance and reliability test program (QART) and be capable of expanding this capacity to handle precipitous failures of a type of warhead. We must be ever more vigilant in the stockpile surveillance program and demonstrate that systemic failures can be anticipated with sufficient time to implement corrective actions. The two Departments must continue to certify high confidence in the stockpile without the benefit of underground nuclear testing.

MAINTAINING HIGH CONFIDENCE IN AN AGING STOCKPILE

In its effort to improve its corporate expertise in aging nuclear weapons, the DOD is becoming a more active partner with the DOE as warheads and components are assessed and certified. At the individual level, the DOD will increase the number of personnel assigned to the DOE weapon laboratories. The DOD-chaired Project Officers Groups (POG) will take a more active role in warhead assessment while gaining a more detailed understanding of weapon life extension procedures. At the Department level, the joint DOD/DOE Nuclear Weapons Council (NWC) will remain the official forum for resolving inter-Departmental issues between the DOD customer and the DOE supplier of nuclear weapons technology. Additional information briefings will continue to be given to the NWC for review of critical issues involving the health of the nuclear weapons stockpile.

As an example of inter-Departmental cooperation, the DOD and DOE are currently formalizing a new annual certification procedure directed by the President for stockpiled weapons. This challenging task is being led by my office with the support and concurrence of representatives of the Services, the Joint Staff, Strategic Command, DOE, and the DOE laboratories. This new process will include an annual survey of the health of the entire stockpile. It will complement the newly implemented Dual Revalidation process which requires a detailed technical analysis of individual warhead types over a 2 to 3 year period. These two new reporting processes will provide timely information on warhead safety and reliability for the NWC.

ISSUES AND THE FUTURE

The SSMP will require continuing support from the Departments of Defense and Energy, the Congress, the administration, and the public. The DOD and DOE must jointly establish methods to measure success of the SSMP at specific intervals. We cannot afford to wait 10 to 15 years to judge the success of the program. DOE must demonstrate the ability to produce tritium and to rebuild all weapons types in the stockpile. Warheads consumed by the surveillance process must be replaced with certified warheads without the benefit of underground nuclear testing, a major undertaking.

Most importantly, opportunities must exist to attract, train, and retain world class scientists and engineers who will be the next generation of stockpile stewards. The safety and reliability of our Nation's nuclear stockpile demand an experienced cadre of our Nation's best.

Since the Manhattan Project, the United States has invested heavily in the development, production, deployment, and maintenance of the National nuclear deterrent. Nuclear weapons, even at significantly reduced levels, remain a core component of future national security strategy. Our DOD/DOE shared responsibility is to ensure high confidence in our nuclear deterrent without underground nuclear testing. This enduring responsibility must have the resources necessary to ensure that the stockpile remains safe and reliable, today and in the future.

Mr. Chairman, members of the committee, absent nuclear testing, the potential for erosion in stockpile confidence will undoubtedly increase with time. To maintain high confidence is a challenge that exceeds those previously faced by our stockpile stewards, but I believe we are on the right track. The President recognized this challenge in his August 11, 1995, speech and remains committed to this challenge. The people in this room and the agencies they represent must meet this daunting requirement. This concludes my statement. I will be pleased to accept your questions now or for the record.

Senator KEMPTHORNE. Dr. Smith, thank you very much.

Our next witness is Mr. Victor Rezendes, Director, Energy, Resources and Science Issues of the General Accounting Office. Welcome.

STATEMENT OF VICTOR S. REZENDES, DIRECTOR, ENERGY, RESOURCES, AND SCIENCE ISSUES, RESOURCES, COMMUNITY, AND ECONOMIC DEVELOPMENT DIVISION, GENERAL ACCOUNTING OFFICE

Dr. REZENDES. Thank you, Mr. Chairman. The Senate Armed Services Committee asked me to take a look at DOE's Nuclear Weapons Stockpile Surveillance Program, a request that we received only last month. The work is in process and I wanted to emphasize the preliminary nature of what I am about to go through.

What we have seen is that the preliminary data indicates that DOE has not conducted all the tests that it believes are necessary to assure itself that it has confidence in the reliability level of the nuclear weapons stockpile. Nuclear weapons testing is an important part in assuring the reliability of nuclear weapons. Over the last almost 40 years, some 2,400 problems have been found with our weapons, half of those considered by DOE to be significant, which means that they resulted in either a defect or a failure of a weapon.

Once the testing falls below a certain level, it is red flagged, which means that DOE's confidence in the reliability of a weapon is in question.

Three current weapons in the stockpile are red flagged and have fallen into that category of a lessening confidence. I will talk about three basic tests that are used to assure their reliability. The first is the actual flight test.

The flight test is where you actually drop the bomb or launch a missile. I want to emphasize that that is without the nuclear package. That is just to see how the system really works.

Of the three weapons that are behind schedule in flight test, two relate to the Minuteman missile. The first one is the W–62, which basically was going to be retired. But that has been delayed, and because of that there is a shortage of telemetry packages for the tests. It is going to take about 3 years before DOE redesigns the telemetry package and has enough to test.

The W–78, also a Minuteman warhead, is also behind schedule, in this case primarily because of the lack of missile launchs made available by the Air Force for DOE testing.

The last one is the W–88, which is used on the Trident Missile. Tests of the W–88 were halted a year ago because of a safety study that was not completed. In essence, when a warhead is dismantled and tested, there are prescriptive, detailed safety procedures that need to be followed. Those were not in place. They are in place now, and DOE expects to be back on track in 1997.

The second type of system testing that is done involves the nonnuclear systems. These tests are designed to detect problems with aging and the manufacture of warhead. Of the weapons in the stockpile, one is red flagged.

This one, again, is the W–88 in the Trident Missile. It has been red flagged. Tests have not been done because the procedural safety study was missing. In addition, a centrifuge that was used to simulate motion in the test had a crack in the weld, and has been out of service for about a year. Again, DOE expects to be on track with that program in fiscal year 1997.

The last piece of testing that is done, is the testing on the nuclear components of the warhead. Every year, of weapons that come back to be tested, one is selected on which they actually do destructive testing of the nuclear components. This is done to see whether, in fact, they could operate as intended.

There are five basic items that are involved in this type of test. They are the pit, the secondary, the detonator, the explosives, and the gas transfer system.

Except for the explosives, the other four elements are also behind schedule—again, for a variety of reasons. I will just give you a little bit of background on that without going into a lot of detail.

Take, for example, the pit, which had been tested at Rocky Flats for many years. As you know, in December 1989, Rocky Flats was shut down for a number of reasons. DOE expected the facility to come back up. However, the facility has not, and after 3 years DOE decided to move those tests to Los Alamos. That created a backlog, and Los Alamos is working to end that backlog in this fiscal year.

The secondary is tested at Y–12. But Y–12 has had some problems since September of 1994. It has been in a stand-down mode because of safety related concerns. The Defense Nuclear Facilities Safety Board had questions about the operations at that facility. The questions basically related to following prescribed procedures. They have been doing some testing on an exception basis, but they are not sure when they will be able to get back to routine testing of the secondary systems.

The detonator used to be tested at Mound, Ohio. That was terminated in 1994, and those tests were transferred to Los Alamos and Lawrence Livermore laboratories. They are going to begin that testing this year, but there is a 2 year backlog, and it is going to take through 1997 to eliminate completely that backlog.

The last system is the gas transfer system, which also was tested at Mound until that facility was closed. That activity was transferred to DOE's Savannah River facility in December 1994. Savannah River will begin testing shortly, and they expect the backlog to be eliminated in fiscal year 1999.

Again, I want to emphasize—and I cannot do this enough—that the reliability of the stockpile, the weapons in the stockpile, has not diminished. What has diminished because of a lack of testing is DOE's confidence in that reliability factor.

This is sort of a probability thing. Without testing, you do not have the confidence that things are as they were the last time you tested them. So the confidence factor is decreasing. The reliability probably has stayed the same and will stay the same until testing is done to provide some indication that something is wrong.

As I mentioned previously, we had lots of questions ourselves as to why this has occurred and whether the corrective actions in place will, in fact, come to fruition. We will be back to this committee later this summer with more descriptive answers, I hope.

Thank you.

[The prepared statement of Mr. Rezendes follows:]

PREPARED STATEMENT BY VICTOR S. REZENDES

We are pleased to be here today to discuss the preliminary findings from our ongoing review of the Department of Energy's (DOE) nuclear weapons stockpile surveillance program.[1] The program uses various tests to identify problems in our nuclear weapons stockpile. Over the years of conducting these tests, DOE and its predecessor agencies have found and corrected many defects and failures in nuclear weapons systems and components. Because our nation's nuclear weapons stockpile is aging and new nuclear weapons are not replacing older ones, this program has become increasingly Important to ensuring the reliability of the stockpile.[2]

Our preliminary analysis of data indicates that DOE has not conducted all the tests it believes are necessary to ensure the reliability of the nuclear weapons in the stockpile. For some types of weapons, the tests are far behind schedule and DOE's confidence in the reliability of those weapons is diminished. DOE has not conducted the scheduled tests for various reasons, including equipment problems, lack of space on missiles for testing, the absence of a required safety study, and delays in testing while testing operations were being transferred to new locations. Although DOE plans to get some tests back on schedule within a few years, it appears that other tests will not be back on schedule for the foreseeable future. I would like to stress at this point that the data is preliminary and we have not yet fully analyzed the impact of this situation.

DOE TESTS NUCLEAR WEAPONS TO ENSURE RELIABILITY

The purpose of DOE's surveillance program is to ensure, through various tests, that the reliability of nuclear weapons is maintained. The testing program is designed to allow DOE to predict the reliability of the entire stockpile by weapon type. The program consists primarily of three types of tests—nonnuclear flight tests, nonnuclear systems laboratory tests, and laboratory tests of the nuclear components. Flight tests involve the actual dropping or launching of a weapon from which the nuclear components have been removed. Nonnuclear systems laboratory tests involve testing the nonnuclear systems in the weapon to detect defects due to aging, manufacturing, or design. Laboratory tests of the nuclear components involve destructive analysis to detect defects or failures in the nuclear portion of the weapon.

Weapons for flight and nonnuclear systems laboratory tests are randomly selected from the stockpile each year. Laboratory tests of the nuclear components are judgementally selected from the weapons that have been randomly selected for the other two tests. For testing purposes, DOE considers the active stockpile to consist of nine weapon types.

From 1958 to 1996, the surveillance program tested about 14,000 weapons, systems, and components with more than 2,400 findings documented. Over fifty percent of these findings were considered "significant findings." A significant finding is the identification of a defect or failure in a weapon system. A defect is an observable anomaly, while a failure is a flaw or malfunction in a weapon that would prevent it from operating as intended. About 1.3 percent of the tests have identified failures.

When a test results in a significant finding, DOE may perform additional tests to confirm the finding, determine the cause of the problem assess its impact on the stockpile, and recommend a corrective plan if retrofits or repairs are needed. According to a DOE official, when a significant number of tests are canceled or delayed, DOE lacks information on the reliability of the weapon.

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[1] This review is being conducted for the Senate Committee on Armed Services in response to its February 1, 1996, request.

[2] DOE's stockpile surveillance program also tries to identify safety problems in nuclear weapons. The primary focus of this testimony, however, is DOE's ability to ensure the weapons' reliability.

FLIGHT AND LABORATORY TESTS HAVE FALLEN BEHIND SCHEDULE

DOE and the National nuclear laboratories[3] have determined that they generally need to test 44 weapons of each weapon type in the stockpile over a 4-year period.[4] Over that 4-year timeframe, the 44 tests per type of weapon should consist of 8 to 12 flight tests (an average of 2 or 3 tests per year) and 32 to 36 laboratory system tests of nonnuclear systems (an average of 8 or 9 tests per year). Finally, from the weapons scheduled for testing each year, one weapon of each type is designated for special laboratory tests of its nuclear components.

Flight Tests

Flight tests involve the actual dropping or launching of a weapon from which its nuclear components have been removed. DOE uses specially designed telemetry equipment to test the integration and functioning of the weapon's electrical and mechanical subsystems. As of February 2, 1996, three of the nine types of weapons that were scheduled to be tested were more than 33 percent below the number of flight tests considered necessary to meet DOE's standard. These weapons are considered "red flagged." According to DOE officials, when a weapon is red-flagged, it means that DOE is concerned with the accuracy of the reliability level assigned to that weapon type and that management should focus attention on the need for obtaining test data. The following table shows the red-flagged weapons, the standard for testing, the red-flag threshold, and the number of tests conducted.

TABLE 1.—FLIGHT TESTING OF THREE WEAPON TYPES, FISCAL YEARS 1992 THROUGH 1995

Weapon type	Standard (tests scheduled)	Red-flag test limit threshold	Actual tests completed
W62	12	<9	6
W78	12	<9	7
W88	12	<9	3

Source. Sandia National Laboratories.

The W62, a warhead used by the Air Force on the Minuteman III missile has been flight tested only six times over the past 4 years. The W78, also used on the Minuteman III missile, is also below the red-flag limit. Only seven W78s have been flight tested during the past 4 years. The third weapon below the red-flag limit is the W88. The W88 is a warhead used by the Navy on the Trident II missile. Only three W88 stockpile flight tests have been conducted over the past 4 years.[5]

According to officials at DOE and the testing laboratory (Sandia National Laboratories) responsible for flight testing, several reasons exist for the shortfall in flight testing. Initially DOE had enough packages of telemetry equipment to test the W62 during its projected lifespan. Retirement of the W62 has been delayed, however, and DOE is running out of telemetry packages and cannot procure additional packages unless they are redesigned. As a result, flight testing of the W62 has been reduced. In regard to the W78, DOE and national laboratory officials told us that flight tests with telemetry equipment were not conducted because available missile launches were used for other tests of the W78. Finally, flight testing of W88s taken from the stockpile was halted for more than 1 year because an important safety study required for disassembly and inspection of the W88 lacked approval.[6]

Although it plans to redesign the telemetry equipment for the W62, DOE estimates it will take at least 3 years to redesign and procure the package. Further, DOE and Sandia National Laboratories officials told us that future flight testing of the W62, as well as the W78, is uncertain because of possible restrictions on the number of missile launches that are made available to DOE by the Air Force. As a result, these two weapons could stay below the red-flag limit.[7] The safety study has been approved for W88s, and a DOE official told us that flight tests for this weapon type should reach desired levels sometime during fiscal year 1997. DOE and national laboratory officials are not concerned about the W88 because they have been able to collect considerable test data during tee past few years by testing W88 systems that were never placed in the stockpile. Because the W88 is a relatively new weapon, DOE and national laboratory officials believe that the information from these "new material" tests provides good reliability data.

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[3] Sandia National Laboratories, Los Alamos National Laboratories, and Lawrence Livermore National Laboratories.

[4] The number of weapons needed to be tested can vary somewhat according to the history of the weapon type and the number of weapons of that type in the stockpile at that time.

[5] The desired number of flight tests for three other weapon types were not performed, but none of these had a shortfall that fell below the red-flag limit.

[6] The Nuclear Explosive Safety Study is required before DOE's Pantex Plant can disassemble and inspect a weapon selected for testing.

[7] DOE and national laboratory officials told us that the limitation on available missiles for weapons testing could also affect the W87 in the near future.

Systems Laboratory Tests

Systems laboratory tests involve testing the nonnuclear systems in a weapon to detect defects due to aging, manufacturing, or design. Only one of the nine weapon types is considered to be below the red-flag limit for systems laboratory tests. Three other weapon types did not have all scheduled systems laboratory tests performed, but were all above the red-flag limit.

The W88 is the red-flagged weapon type. It should have had about 28 laboratory tests conducted, but over the past 4 years, only 12 laboratory tests were performed. According to DOE and national laboratory officials, the tests were not conducted because of the aforementioned absence of a safety study and because a centrifuge used to simulate weapon motion was inoperative for about 1 year because of a cracked weld. Like the flight tests, DOE plans to be back on schedule in fiscal year 1997.

NUCLEAR COMPONENT LABORATORY TESTS HAVE BEEN DELAYED

From the weapons scheduled for testing each year, one weapon of each type is selected to have its nuclear components package destructively tested. According to a DOE official, the five key components tested are the pit, the secondary, the detonator assembly, the high explosives, and the gas transfer system.[8] Generally, for each weapon type, one pit, one secondary, two to five detonator assemblies, the high explosives from one or two weapons, and one or two gas transfer systems are to be tested annually. Testing of four of these nuclear package components have been behind schedule in recent years. Only testing of high explosives has been conducted on schedule.

The pit is a part of the nuclear package that, until 1989, was manufactured and tested at DOE's Rocky Flats facility in Colorado. In. December 1989, the Rocky Flats facility ceased production operations, and responsibility for pit testing was eventually transferred to DOE's Los Alamos National Laboratory. At first, it was thought that Rocky Flats would reopen, and several years passed until DOE decided to move pit tests to Los Alamos. This lapse created a backlog of pit tests. Los Alamos has nearly caught up and should be back on schedule by the end of this fiscal year.

The secondary is tested at DOE's Y12 facility in Oak Ridge, Tennessee. Few have been tested since September 1994 when Y12 was placed in a "stand down" mode because of problems related to safety procedures that had been noted by the Defense Nuclear Facilities Safety Board. According to DOE officials, most of these problems did not involve unsafe conditions. The problems were related to not following approved procedures for activities being conducted. DOE is in the process of testing seven secondaries (from four different weapon types) under special procedures but DOE officials could not provide us with a date for resuming full testing.

DOE's Mound facility in Ohio tested detonator assemblies until 1994. At that time, responsibility for testing detonator assemblies was moved to DOE's Los Alamos and Lawrence Livermore laboratories. Both laboratories are scheduled to begin testing detonator assemblies later this year. In the meantime, a 2-year backlog of detonator assemblies exists. DOE officials estimate that this backlog will be eliminated by the end of fiscal year 1997.

DOE's Mound facility in Ohio tested gas transfer systems until 1994. At that time, responsibility for testing gas transfer systems was moved to DOE's Savannah River facility in South Carolina. Savannah River has begun testing some gas transfer systems, but a DOE official estimates that the backlog will not be eliminated until the end of fiscal year 1999.

In summary, Mr. Chairman, the preliminary results of our work indicate that portions of all three major components of DOE's stockpile surveillance program have been and are currently behind schedule. DOE is behind schedule for a variety. of reasons and while some tests will soon be back on schedule, others will not be for the foreseeable future. These programs will become more important as weapons in the stockpile age beyond their originally planned lifespan. As we continue our work on this assignment, we will be analyzing the overall impact of this situation and DOE's corrective action plans.

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[8] The pit is a metal casing that contains plutonium and other material. The pit is where the fission explosion originates. A nuclear weapon secondary is an assembly in a nuclear weapon where a fusion explosion originates. A gas transfer system includes a tritium reservoir and associated hardware.

Mr. Chairman, this concludes our prepared statement. We will be glad to respond to any questions you or any member of the subcommittee may have.

Senator KEMPTHORNE. Mr. Rezendes, thank you.

I want to make a part of the record right now the point that next year our nuclear weapons stockpile becomes the oldest stockpile in the history of this country.

Mr. REZENDES. Correct.

Senator KEMPTHORNE. As we listened to your report on the assurance, as to the dependability of the system and the key elements, such as detonators, et cetera, we have no conclusions yet. But that we are "backlogged" raises serious concerns. Couple that with the fact of the advocacy of no more testing and that we are perhaps 10 years away from the computer modeling that will give us that assurance that we need raises very serious questions, I believe, that we must get out on the table so that 5 years from now, all of us who have been involved with this do not look back and say well, we missed that one or we did not appropriately address that.

I appreciate the depiction of the Department of Energy and the Department of Defense working so closely in partnership. But I am going to urge all witnesses that if there is something that ought to be flagged, I encourage you to flag it. Flag it now so that we can address it now through budgets, through policy, et cetera, because the last thing we need to do is tell some future generation of Americans that well, we overlooked that or we thought everything was fine.

Mr. Rezendes, what you have just said is things are not yet fine.

With that, Ms. Rohlfing, welcome. Ms. Rohlfing is the Director of the Office of Nonproliferation and National Security. Welcome.

STATEMENT OF JOAN B. ROHLFING, DIRECTOR, OFFICE OF NONPROLIFERATION AND NATIONAL SECURITY, DEPARTMENT OF ENERGY

Ms. ROHLFING. Thank you, Mr. Chairman. I would like to start by thanking you and the staff for the seating arrangement at the table. This group testified together yesterday morning before the House National Security Committee, and I was seated directly to Dr. Smith's left.

Because time is short and we have a very full agenda this morning, I will confine my oral remarks to a brief description of only two of the department's remarkable accomplishments in the area of nonproliferation over the last year.

Let me start by describing the great progress we have made in helping Russia and other former Soviet States secure their nuclear materials. Last year, my predecessor, Mr. Ken Baker, came before the committee and recounted our success in initiating a program we called Materials—Protection, Control and Accounting.

Mr. Curtis emphasized the importance of this program in his remarks. What I would like to do is offer you a few metrics on our program progress since last year.

At this time last year, we had completed security upgrades at only one nuclear facility in Russia, a civilian nuclear research facility at the Kurchatov Institute. We were very proud of that work and briefed the committee on our work at that first institute.

I am pleased to report to you that today, only 1 year later, we have achieved agreements with over 35 locations in the former Soviet Union and we continue to conclude agreements with additional sites at a rapid pace.

Last year, when we testified before the committee, we had secured approximately 75 kg of highly enriched uranium. Since that last testimony, we have secured tons of nuclear material and will improve the security of tens of additional tons by the end of 1996.

These are remarkable achievements by any measure, but even more so in light of the fact that our work with each facility must be done on a negotiated, cooperative basis.

Last year, based on a promise of progress and demonstrated success at only a single facility, the committee supported our budget request of $70 million for fiscal year 1996. We believe we have delivered on and even exceeded our commitments to you last year.

Based on this demonstrated record of achievement and the anticipation of continued rapid progress, we request the committee's support of $94.2 million for this program in fiscal year 1997.

The second nonproliferation highlight that I want to note for you this morning concerns a technological breakthrough that the department achieved last summer. In the department's nonproliferation R&D program, we are working to develop technologies that will allow us to detect the covert production of plutonium and highly enriched uranium by proliferant nations.

A proliferant's most difficult step in developing nuclear weapons is the acquisition of weapons grade plutonium and uranium. Our ability to detect covert indigenous production of these materials is, therefore, critical to our ability to identify proliferation threats as they are emerging and essential to developing appropriate responses.

Today, our ability to detect covert materials production is limited by our ability to gain access or proximity to suspect facilities. One of the primary goals of our nonproliferation R&D program, therefore, is to detect the production of these materials remotely, thus eliminating our dependency on access or proximity to a suspect facility.

At DOE, we are currently pursuing the goal of remote detection in a technology development program called CALIOPE (Chemical Analysis by Laser Interrogation of Proliferation Effluents). CALIOPE is a sensor system that will fly on an airborne platform and detect the presence of chemicals that are indicative of nuclear materials production.

Last summer, using prototype equipment set up in a field environment, we demonstrated the ability to detect chemicals of interest at a significant stand-off distance. Based on this breakthrough, we are optimistic that, within the next 4 years, we will complete technology development and field a new national capability for proliferation detection.

CALIOPE is only one example of the important work accomplished through this R&D program. The department's nonproliferation R&D program is a unique program dedicated to providing the technologies and systems needed to monitor, detect, and characterize proliferant activities worldwide, both cooperatively and noncooperatively.

Your support for the department's fiscal year 1997 budget request of $195 million for nonproliferation R&D is vital to insuring the Nation's continued capability to detect and deter proliferation, verify treaties, and respond to future challenges.

Thank you.

[The prepared statement of Ms. Rohlfing follows:]

Prepared Statement by Joan B. Rohlfing

Good morning Mr. Chairman and members of the subcommittee. It is my pleasure to address you today as the Director of the Office of Nonproliferation and National Security at the U.S. Department of Energy (DOE).

In recent years, the worldwide proliferation of Weapons of Mass Destruction (WMD) and their missile delivery systems has emerged a one of the most serious dangers confronting the United States. This is a continuing and evolving problem with broad consequences for international security and stability. Al least 20 countries—some of them hostile to the United States—already have or may be developing WMD through the acquisition of dual-use technology, indigenous development and production, and/or support from rogue supplier states. Additionally, safety and security of existing nuclear weapons and materials are of increasing concern as economic and social pressures mount in countries such as Russia, Ukraine, Kazakstan and Belarus.

The President has made nonproliferation one of this nation's highest priorities. As the preeminent agency in nuclear materials and weapons technology and protection, the Department of Energy, through the Office of Nonproliferation and National Security, is uniquely suited to provide leadership in national and international efforts to reduce nuclear weapons worldwide; secure and prevent the spread of nuclear materials, technology and expertise; roll back nuclear weapons development programs; avoid proliferation surprise; and respond to nonproliferation emergencies. We particularly draw upon 50 years of science and technology expertise resident throughout the DOE National Laboratory complex to help us achieve these goals.

To reduce the international proliferation threat, the Office of Nonproliferation and National Security is focusing its resources and expertise on the following near-term priorities: (1) securing nuclear materials, technology and expertise in Russia and the Newly Independent States; (2) maintaining effective protection, control and accountability of nuclear materials, technology and expertise in the United States; (3) limiting weapons-usable fissile materials worldwide; (4) ensuring transparent and irreversible reductions of global nuclear stockpiles; (5) supporting the completion of a Comprehensive Test Ban Treaty in 1996; (6) developing and integrating a program for preventing, detecting and responding to nuclear terrorism and smuggling; (7) controlling nuclear exports; and (8) strengthening the nuclear nonproliferation regime. Through the unique scientific, technical, analytical and operational capabilities of the Department and its National Laboratories, we are working to effectively and efficiently accomplish these near-term priorities by marshaling and integrating our resources and nonproliferation activities.

Some of our most important international activities include: conducting the Government-to-Government and laboratory-to-laboratory programs of cooperation between U.S. nuclear experts and their counterparts at nuclear facilities and accountability of nuclear materials; assisting Russia and the Newly Independent States in establishing and enhancing nuclear material export control systems; developing advanced technologies and systems to detect the indigenous proliferation of WMD, to enable the verification of arms control treaties, and to facilitate the collection of intelligence information in noncooperative environments; conducting critical operations in cooperation with the Democratic People's Republic Of Korea to stabilize and safely store spent nuclear fuel thereby both freezing the North Korean nuclear weapons program and enabling the application of effective International Atomic Energy Agency (IAEA) safeguards; working with the private sector to engage WMD weapons scientists, engineers and technicians in the former Soviet Union in activities which reduce the proliferation threat; and providing technical support of long-term monitoring of Iraqi facilities and other nuclear safeguards and emergency programs of the IAEA. In addition, we are providing unique and in-depth technical, arms control, intelligence, research and technology expertise as part of the U.S. Government's integrated efforts to conclude negotiations, prepare for entry into force, and implement a CTBT.

The Department's unique technical and analytical capabilities allow us to play a pivotal role in the weapons of mass destruction arenas of the U.S. Intelligence Community. For example, DOE continues to contribute to National Intelligence Estimates and to support the Intelligence Community's Non-Proliferation Center in assessing the activities of emerging nuclear weapons states and terrorist organizations, the activities of states that apply nuclear materials and expertise, and theft and smuggling of nuclear material.

In concert with our international activities, we are responsible for conducting a wide range of domestic activities that support our nonproliferation and national security goals. These activities include: directing a rigorous safeguards and security program for the entire Department of Energy complex, thereby ensuring the demonstrated security of our own nuclear materials, technology and expertise; declassifying millions of DOE documents while protecting critical information that has the potential to facilitate the proliferation of weapons of mass destruction; and maintaining a security investigations and reinvestigations program for both Federal and contractor employees of the Department. We also provide technical, analytical, policy and implementation support to the efforts of the Nation's policy community to deal with nonproliferation issues.

We also ensure the Department has a robust emergency management and response capability for nonproliferation, energy and nuclear emergencies. Through this program, we provide assistance to other Government agencies as well as state, tribal and local Governments. Over the past year, we have been providing emergency response experts to assist other foreign Governments in reviews of their emergency preparedness plans and capabilities. Through the Partnership for Peace, we have been working with the Departments of State and Defense to assist Russia and the Newly Independent States to plan for and manage energy and radiological emergencies. We also have been working with the International Atomic Energy Agency, International Energy Agency and Arctic Environmental Protection Strategy to develop procedures and support plans for any radiological emergency.

ACCOMPLISHMENTS

Over the past year, we have demonstrated leadership and achieved significant accomplishments in each of our near-term priorities:

✔ In 1995, our cooperative efforts with Russia and the Newly Independent States in securing nuclear materials, technology and expertise, has protected over 8 tons of direct-use nuclear material with upgrades to 26 facilities' material protection, control and accounting programs. Before the end of 1996, we expect to broaden this effort to over 35 facilities and protect hundreds of tons of plutonium and highly enriched uranium. Additionally, we have begun. discussions with the Russian Navy to begin upgrades on their nuclear facilities as well.

✔ We have engaged nearly two thousand weapons scientists, engineers and technicians on 219 scientific projects at 77 institutes in Russia, Ukraine, Kazakstan and Belarus to prevent a "brain-drain" of these scientists to other countries that would employ them for their own indigenous nuclear weapons programs.

✔ Our work in North Korea has effectively stopped their indigenous nuclear weapons development program. We have a team currently in country canning the spent fuel to prevent its reprocessing for use in nuclear weapons. Additionally, we have enabled the IAEA to apply international safeguards on the existing nuclear facilities remaining in North Korea.

✔ We are the sole agency responsible for developing technologies to monitor and verify a Comprehensive Test Ban Treaty. In 1995, we demonstrated significant progress in each of the sensor technologies required to support an international monitoring, and automated data processing. One particular success is our improvement of the capability to more easily distinguish nuclear explosions from earthquakes—a formidable step toward a greater verification capability.

✔ In 1994, the Office of Nonproliferation and National Security completed installation of sensors on all Global Positioning Satellites that allow the United States to continuously detect near-earth and atmospheric nuclear explosions and verily treaty compliance worldwide. In 1995 we began developing and deploying the next-generation of sensors to improve our detection capability.

✔ We have also completed the first comprehensive assessment of all the chemicals that might be used in a nuclear weapons life-cycle. This positions the United States to develop better techniques to detect an indigenous nuclear weapons program.

✔ Our declassification program has also played an instrumental role in furthering U.S. nonproliferation goals, especially in the initiative to achieve a bilateral agreement with Russia for the exchange of classified information to facilitate confirmation of transparent and irreversible nuclear weapons reductions.

✔ The Department's safeguards and security functions that were previously spread across the DOE complex are now consolidated within the Office of Nonproliferation and National Security. This achievement is an important step toward creating a responsive and efficient focal point for the Department's nuclear safeguards and security program and providing a national-level technical resource which is capable of fully supporting multilateral nuclear nonproliferation efforts.

LOOK TO THE FUTURE

With our many achievements, there is much work to be done in our long and short term priority areas. We cannot rest on our laurels and expect the global nuclear danger to reduce on its own. The programs of the Office of Nonproliferation and National Security seek to broaden their effects wherever they are able.

In the coming year and a half, the Department will accelerate efforts to provide enhanced materials protection, control and accounting for fissile materials in Russia and the Newly Independent States. We hope to complete all MPC&A improvements in former Soviet Union states outside of Russia by the end of calendar year 1997 (with the majority of work being completed by the end of the fiscal year). In Russia, we intend to expand cooperation to the remaining facilities in the civil nuclear complex while continuing work with facilities related to the nuclear weapon complex. Our efforts with *Gosatomnadzor* (the Russian agency equivalent to the U.S. Nuclear Regulatory Commission) to design and promote an indigenous MPC&A standards system will ensure that Russian weapons usable material will be protected after the U.S. involvement has been completed. The program as a whole anticipates upgrades at 50 locations in Russia and 13 locations in the Newly Independent States completed by the year 2002.

We are working to improve regional arms control and nonproliferation regimes through programs such as the Cooperative Monitoring Center (CMC) in Albuquerque, New Mexico. At the CMC, we assist political and technical experts from around the world acquire the technology-based tools they need to assess, design, analyze and implement nonproliferation, arms control and other security measures in their own regions. This particularly fosters regional security and lessens the desire for nations to acquire or develop their own weapons of mass destruction. We plan to further expand this effort with states of the Middle East, South Asia, the Koreas, and China.

In 1996, we hope to conclude an Agreement for Cooperation and a Stockpile Data Exchange Agreement with Russia that will allow us to gain insight into warhead dismantlement. These agreements will build confidence between our two nations that our mutual nuclear arms reductions are in fact occurring and irreversible.

These examples show that our activities are truly beneficial. Through our robust and cost-effective programs, we are able to provide leadership in the nonproliferation community, further the nonproliferation goals of the United States, and ensure the National security.

BUDGET REVIEW

The table below summarizes the fiscal year 1997 budget request for the Office of Nonproliferation and National Security from the Energy and Water Development Appropriation as compared with the fiscal year 1996 adjusted appropriation (in thousands).

Appropriation/activity	Fiscal year 1996 appropriated	Fiscal year 1996 comparable	Fiscal year 1997
Program Direction [1]	....	$82,809	$95,622
Nonproliferation and Verification Research and Development	$216,142	210,718	194,919
Arms Control and Nonproliferation	160,964	145,057	181,244
Intelligence	42,336	30,957	29,185
Soviet-Designed Reactor Safety [2]	30,000	....	....
Nuclear Safeguards and Security	84,395	46,172	47,208
Security Investigations	20,000	20,000	22,000

Appropriation/activity	Fiscal year 1996 appropriated	Fiscal year 1996 comparable	Fiscal year 1997
Emergency Management	23,321	16,866	16,794
Congressional Budget Request	$577,158	$552,579	$586,972

[1] The fiscal year 1997 budget request includes a new Program Direction line item as mandated by the Energy and Water Appropriation for fiscal year 1996. This new budget line item provides funding for salaries and benefits, travel, support service contractors and other related expense associated with the overall management and administration of the Office of Nonproliferation and National Security

[2] The Soviet Designed Reactor Safety program is run by the Office of Nuclear Energy and funding for this program has been included elsewhere in the Other Defense Activities account.

The Nonproliferation and Verification Research and Development budget request for fiscal year 1997 reflects a savings of $15.3 million. This savings in part is a result of our effort to eliminate duplication between agencies and within DOE, improving coordination between sponsoring agencies, streamlining operations and generating a meaningful cost savings.

The Arms Control and Nonproliferation budget request includes a net increase of $36.1 million concentrated in the area of material protection, control and accounting. This increase is due to the rapid pace of expansion of cooperation with Russian facilities and is important to ensure early safeguarding of weapons usable material at their source. We are also expanding our efforts in the Reduced Enrichment Research and Test Reactor (RERTR) and Industrial Partnering Programs. The increase will also allow us to ensure that the canned spent nuclear fuel in North Korea is not used in an indigenous nuclear development program.

Finally, the increase, will provide increased analysis and support to: U.S. nuclear arms control policies in the Middle East, Asia and South Asia, nuclear energy security issues in Asia, South Asia and Europe, and U.S. policies to deal with excess civil plutonium.

The Intelligence budget request reflects a modest reduction from year 1996 resulting from realized efficiencies. The request will provide for timely, high-impact analysis and reporting on the proliferation implications of selected nuclear weapons states' programs, emerging nuclear proliferants, nuclear suppliers, and global impacts to the U.S. energy security.

The Nuclear Safeguards and Security budget request for fiscal year 1997 includes a net increase of slightly over $1 million. Through a requested increase and reprioritization of funding needs, we intend to increase the Classification and Declassification budget by approximately $2.3 million. This increase seeks to further develop advanced automation technology in support of the Declassification Productivity Initiative program and implement Executive Order 12958 on Classified National Security Information.

Finally, the Emergency Management budget request for fiscal year 1997 is unchanged from the fiscal year 1996 appropriation. The change reflected in the summary table above is exclusively a result of consolidation of Program Direction funds.

CONCLUSION

Preventing the spread of weapons of mass destruction is a crucial aspect of our national interest, and the Office of Nonproliferation and National Security is uniquely capable to serve this national interest, especially through the efforts of our national laboratories. Our science and technology base enables us to provide unique solutions to national and international nonproliferation problems. The work we do benefits the Nation's security across a broad spectrum: protecting nuclear material in the United States and worldwide; rolling back existing nuclear weapons development programs internationally; ensuring the verifiability of nuclear treaties, especially a CTBT; and responding to energy and nonproliferation emergencies.

Senator KEMPTHORNE. Director Rohlfing, thank you very much for your comments.

I would like to begin now a series of questions where each Member can have approximately 5 minutes.

Let me also acknowledge that we have been joined by Senator Frist and Senator Hutchison. We welcome both of you to this morning's hearings and will look forward to your participation as well.

With that, Dr. Reis, let me address my first question to you.

This deals with the whole question of our nuclear weapons stockpile and its reliability. Last year, you and I had a very good discussion in my office. I would like to revisit that. I would like you to just explain for us with regard to these weapons how you will determine that, while they are the oldest stockpile we have, you can keep them current and modern. This deals with the interchangeable parts.

So, if you could, just give me in layman's terms what is going on there and how you are now proceeding based upon actions we took last year.

Dr. Reis. To put it in layman's language, you do the same thing with your automobile. Every time there is a problem in your automobile, you do not stop and buy a new one, though occasionally that does happen. You replace the parts. Indeed, if you look upon the streets in this country, you see many old automobiles. But, if you were to look inside them, you would not see only old parts. Frequently, you would see new parts.

As long as the whole thing is not changed, those automobiles pretty much keep the same characteristics. You don't see old Model A's running on today's highways, but you still do see Model A's which last for very, very long periods of time. People work on them and take very good care of them. They watch them. They watch where the components are and when they fail. In fact, if it's done right, parts are replaced even before they fail.

As we have talked about before, Our surveillance program in the past has been primarily to look very carefully at every component. As you know, we take these weapons apart piece by piece and look at them. We look at them very, very thoroughly and then replace and remanufacture those parts that are needed.

What we are going to try to do now with our enhanced surveillance program, which involves not just the laboratories but the production plants as well, is have the ability to predict ahead of time where defects might occur and then replace those parts. In this way a weapon can last almost indefinitely.

Senator Kempthorne. So, Dr. Reis, these weapons are simply a series of parts and are all critical elements of the weapon. Do they lend themselves to being component parts that can be replaced? Do we have the capability currently that any and all of those parts we have at our disposal to replace?

Dr. Reis. Currently, we have the capability to replace each and every part, with the exception of the primary, the pit. As has been testified to earlier, when Rocky Flats closed, we lost the ability to replace those.

But, we are in the process right now of bringing up Technical Area 55 (TA–55) at Los Alamos to do those replacements. We believe, that at the rate those replacements will be necessary in the future, this facility will be acceptable for future pit manufacturing.

Senator Kempthorne. For the record, in written form, would you just give me that time schedule?

Dr. Reis. Yes.

[The information referred to follows:]

The projected schedule for establishing a pit production capability in Technical Area 55 at the Los Alamos National Laboratory is as follows:

Conceptual Design	Jan. 1996 to Jan. 1998
Detailed Design	Jan. 1998 to Oct. 1999
Construction	Mar. 1999 to Jan. 2003

Preoperational/Startup	Jul. 2001 to Jan. 2003
First Production	Oct. 2002 to Mar. 2003

Senator KEMPTHORNE. Also, last year the subcommittee expressed strong concern about the need to modernize the manufacturing technologies at the four production plants in order to provide for the near and the mid-term refitting and rebuilding of the nuclear stockpile.

In fact, we authorized up to $143 million in fiscal year 1996 for that purpose, along with clear guidance about the high priority of this task. You did not fund this in 1996. You do not plan to fund it in 1997. My question is why have you made that decision.

Dr. REIS. That is a priority issue, Senator. We are looking very hard, as we did in 1995, and we continue to look very hard in terms of where the appropriate manufacturing facilities are. We definitely intend to increase over time the ability to remanufacture and modernize the plants. Our long-term plan, as put out in the draft Programmatic Environmental Impact Statement, clearly says our plan is to improve the manufacturing, modernize the manufacturing in the production plants, not just in the laboratories.

Our first priorities have been in the surveillance area and in continuing the manufacturing of the current stockpiles the way we have now.

Senator KEMPTHORNE. So this is still a possibility?

Dr. REIS. It is in our plan.

Senator KEMPTHORNE. But not the near plan. Not in 1996; not in 1997.

Dr. REIS. Again, we are in the process of upgrading some of the manufacturing. But in terms of the full manufacturing, it is still a plan. Yes, sir.

Senator KEMPTHORNE. Mr. Curtis, last year you told me that the Department of Energy had no weapons manufacturing plan. Do you have one this year and will you provide it to the committee?

Mr. CURTIS. I am not sure precisely of your question. May I try to rephrase the question to see if I have it?

Last year, what I think I said was we had no requirement from the Department of Defense to design or produce a new weapon type. It is still the case that we have no requirement from the Department of Defense to design or produce a new weapon type.

Is that your question?

Senator KEMPTHORNE. No. I remember we had a discussion.

Dr. Smith, at one of our hearings I had asked if you had seen the plan and what your reaction to the plan was. The plan did not exist, and you said we need to wait to see what the plan is. So my question is is there such a plan today?

Mr. CURTIS. What we were discoursing on last year was the substance of the Stockpile Stewardship and Management Plan. That was only sketched out in broad, directional terms last year.

Definition to the plan is being given in a joint planning process with the Department of Defense in an exercise that we refer to as the Green Book. We expect to be able to conclude and to submit that plan to this committee within this month. I referred to that in my opening statement.

Perhaps Dr. Smith would wish to add something.

Senator KEMPTHORNE. Dr. Reis.

Dr. REIS. I would just like to add that in that plan, we did go through weapon by weapon, component by component, when we expected that we would have to remanufacture each. We played that out in detail over the next 5 years and beyond. That, indeed, will form the basis of our remanufacturing and modernizing of the future.

Just to bring you up to speed, the plan has been submitted to the Department of Defense, to the Strategic Command, and to the National Security Council, and I have almost all of their comments back. As soon as those comments are incorporated, the plan will be available for the committee.

Senator KEMPTHORNE. Thank you very much.

Senator Bingaman.

Senator BINGAMAN. Thank you, Mr. Chairman.

Mr. Rezendes, let me just paraphrase what I believe the substance of your testimony is. It is that the Department of Energy, according to your study, as of this time has not done all of the quality assurance tests that it had internally planned to do. Is that correct?

Mr. REZENDES. That is correct.

Senator BINGAMAN. This does not indicate that there is a problem with the reliability of the weapons, but, in your view, it undermines the confidence of the Department of Energy in the reliability of the weapons, is that correct?

Mr. REZENDES. Correct. That is a confidence level. Picking up on Dr. Reis' example of an automobile having a lot of parts, you can take that car, go out and have it tested and everything could be OK. Unlike an automobile, a nuclear weapon is not driven every day. It is only periodically being tested.

So the longer the period of time before you turn the key to start it or retest, the lower your confidence level is that the car is OK. It does not mean, the fact that you have not driven it, that it is not OK. It is just that your assurance of that confidence level has gone down.

Senator BINGAMAN. Have you gone back, for example, and looked at previous time periods and said, for example, in 1992, what was the record of testing that was going on and whether there was a shortfall at that time as well, so that you would be able to say that the problem has worsened or the problem has improved, that the record has improved?

Senator KEMPTHORNE. Mr. Rezendes, let me say that the microphones apparently are back on. Would you please use it.

Mr. REZENDES. That is a really good question. I want to emphasize that this is still a work in process. We have a lot of work to do here. That is exactly one of the areas we are pursuing.

I have not seen the historical data, but we did ask that question, and we were told by the laboratories that the red flagging was put in a few years ago because of the concern that they were falling behind.

The indication we have from the laboratories is this is an unusual situation today. It has not historically existed in the past.

I do not have the documentation to tell you whether that's so or not or what it was prior to 1990.

Senator BINGAMAN. So you cannot tell me whether the situation is better today in 1996 than it was in 1992 or not?

Mr. REZENDES. From 1992 I can. I do have some numbers. It is getting worse, not better.

Senator BINGAMAN. It has worsened since 1992?

Mr. REZENDES. Correct. We have three weapon systems that have fallen behind this red flag. Probably by next year or the year after, we may have another one that will come in as well.

Senator BINGAMAN. Let me ask Dr. Reis if he would comment. If the concern here is that DOE is losing confidence in the reliability of the stockpile, you are the person really responsible for the reliability of the stockpile most directly, at least the way I think of the structure in the Department of Energy. Do you believe that there is a problem with the reliability of the stockpile?

Dr. REIS. No, I don't believe there is a problem with reliability in the stockpile. I think what you see, really, is a heightened sense of awareness and concern about the confidence in the stockpile. In the past, there were many weapons. There was always the possibility of new production coming on board. I think it is very important that we go back and relook at the weapons themselves. I think we are doing that. As we discussed earlier, this is what the game is all about now. It is really the confidence in the enduring stockpile.

So, I think, it is important that we examine all of our procedures, that we get the appropriate number of tests done, and that we look specifically at the standards that we've set. Are they the appropriate standards? We are trying to push this both now and in the future. The other aspect that I think is new is the cooperation of the Department of Defense. They are the ones, ultimately, who have to work it.

Again, going back to Dr. Smith's opening statement, as of now, as of today and what we are doing, there is no concern about the reliability of those weapons or their safety. I point out to you that some of the concerns that our colleague has mentioned are safety concerns. We really do have a heightened concern about safety and we want to balance, if you will, safety and reliability.

Again, what we are talking about is confidence and projecting that confidence in the future.

Senator BINGAMAN. My time is up.

Mr. CURTIS. Senator, may I just add one point?

Senator BINGAMAN. Yes.

Mr. CURTIS. I think it is extraordinarily important, because we have mentioned three weapon systems, weapons types, in this, to emphasize from this regarding that there is no implication to the reliability of the nuclear deterrent. While the confidence has eroded under the system of measured confidence, it has not eroded to a degree of significance. I believe that should be pointed out as well.

Dr. REIS. I would refer again to the remark that we are going through extraordinary efforts to get these weapons back on track so that we are sure that the confidence level stays high. Remember, the reliability is fixed; what we are talking about is the confidence level, and we are trying to push that confidence level up to very high levels.

Senator BINGAMAN. My time has expired, Mr. Chairman. Thank you.

Senator KEMPTHORNE. Senator Bingaman, thank you.

Dr. Smith, did you wish to add to that?

Dr. SMITH. Just a very brief statement, that the Department of Defense does expect the Department of Energy to maintain reliability and confidence in the future as they have in the past. So the statement that Dr. Reis just made regarding back on track is key from our point of view.

Senator KEMPTHORNE. Thank you very much.

Senator Hutchison.

Senator HUTCHISON. Thank you, Mr. Chairman.

I have two areas of interest. The first is a general area.

As the Chairman stated, I am very concerned about the Department of Energy seeming to be intent on downsizing the U.S. capability to produce nuclear weapons at a time when I think international proliferation and instability is getting higher.

I would like to ask Dr. Smith and Dr. Reis if you anticipate the potential that we might need to produce new specifics to replace the old, aging ones that were mentioned by the Chairman, and if your current budget projections anticipate that possibility.

Dr. SMITH. Senator Hutchison, we have an arsenal today measured in thousands of weapons. We think that is more than adequate to deter a resurgent Soviet Union, and we think it is more than sufficient, obviously, then, to deter any other would-be sovereign or rogue power that might threaten us with nuclear weapons.

So long as we remain confident that the Department of Energy can maintain that arsenal, presently at thousands of weapons, coming down under the best of circumstances to the START II level, which would be of the order of 3,000 weapons, we think we are meeting our responsibilities to the Nation to provide an adequate nuclear deterrent.

Senator HUTCHISON. What if START II is not ratified by the Soviet Union?

Dr. SMITH. We have been very clear there, Senator Hutchison. We will not breach the START I level until the START II treaty enters into force—which is more than just ratification. Even there, we do not promise to then head for the START II limit. We would simply give the matter serious consideration.

It is not a matter of consideration up to and until START II enters into force.

Dr. REIS. Senator, let me respond also. We are designing our capacity to handle the full START I numbers. It's not a question of going to START II and surging back to START I. We are maintaining our capability at the START I level taking our lead from the Department of Defense. If they are prepared to go to START II, as Dr. Smith has said, we will subsequently downsize further. But, our targets are all working for the START I numbers.

Senator HUTCHISON. So your current budget projections are not going to anticipate the need to produce new weapons?

Dr. REIS. That is correct.

Senator HUTCHISON. I would like to turn to a more parochial issue, and that is—I hate to speak in "bureaucratese"—the SSM PEIS, which states that comparable facilities for the high explosive operations exist at Lawrence Livermore and Los Alamos.

Now I am sure you know that the entire Texas delegation has written a letter to Ms. O'Leary objecting to a proposal that those high explosive operations be moved from Pantex.

I would just ask you this question. Doesn't Pantex have the most modern high explosive operations manufacturing facilities in the complex, and would you not have to replicate these facilities at another site at additional cost?

Dr. REIS. We have looked at all three facilities. They are all three modern. We have not yet made a decision as to where to do the high explosives work. Until we finish the program evaluation, which will be this summer, we really are looking at all three. We have not made a decision at this time.

Senator HUTCHISON. Let me then ask you a follow up. If assembly and disassembly are at Pantex and you move the high explosive fabrication elsewhere, would that not create a problem of transportation of hazardous materials cross country, and would it not make more sense to manufacture high explosives at Pantex and transport them just within the confines of the plant?

Dr. REIS. Those are just the items that we will be looking at over this next 6 months.

Senator HUTCHISON. That will be a major factor in your consideration, then?

Dr. REIS. Absolutely. It certainly will.

Senator HUTCHISON. Thank you.

Thank you, Mr. Chairman.

Senator KEMPTHORNE. Thank you, Senator Hutchison.

Now, the Ranking Member of the subcommittee, Senator Exon.

STATEMENT OF SENATOR J. JAMES EXON

Senator EXON. Mr. Chairman, thank you very much. I apologize for being late as there were some other problems that I had this morning. This is a very, very important hearing that I look forward to each and every year.

I would like to ask unanimous consent that my opening statement be included in the record, as if read.

Senator KEMPTHORNE. Without objection.

[The prepared statement of Senator Exon follows:]

PREPARED STATEMENT OF SENATOR J. JAMES EXON

Thank you, Mr. Chairman. I join you in welcoming the multitude of witnesses to this second panel. Since this will obviously be a lengthy session, let me not take further time with opening remarks, so that we can get to what the witnesses have to tell us.

Senator EXON. I would just like to highlight one concern that I have in this area. Unfortunately, we are discussing some very, very important matters here, as we have in the past in each and every year, but without the budget proposal. I would like to ask, Mr. Chairman, if you would agree, and if so, if you could ask the witnesses if they would agree, that when we receive the budget, there may be some additional questions that should be asked about it. But at this hearing, we don't know what the budget is, so we can't ask them at this time.

I would simply like to ask, if it is satisfactory to the chairman of the subcommittee and to the witnesses, that we would reserve the right to send questions to the witnesses as Members of the committee think would be in order after the submission of the budget.

Senator KEMPTHORNE. Yes, that would be very much in order.

Senator EXON. Is there any objection to that by the witnesses?

Mr. CURTIS. No, sir.

Dr. REIS. Not at all.

Senator EXON. Thank you very much.

I have been listening with some interest to what I heard when coming into the room. I salute you and the department for taking the stance that I think is very reasonable. It is something that we should recognize as we move ahead. What we do with regard to the safety and reliability of our nuclear inventory is not only important as far as our national security policy is concerned, but it also has a bearing on what happens around the rest of the world.

Some of this concern I think is a concern that is not justified. With regard to the reliability of our weapons systems, there is a movement on some people's part to begin nuclear testing once again. I think you know that this Senator has led to opposition to that, notwithstanding the fact that I have long recognized and realized how important our nuclear deterrent is. We have all kinds of ramifications to all of these things, including START I and START II that you have referenced somewhat this morning.

I would simply say that, with the significant advancement ahead of all other countries, I believe that by the use of our laboratories, strengthening them, we can be as reasonably sure—and that is all we can ask—as to the safety and reliability of our system. I, for one, would resent, at least at this time, given the world situation and our hope that we can stop the spread of nuclear devices otherwise, and I shudder at what would happen if the United States of America would do what France did with regard to beginning testing alternative over again. I think that would just open up a whole new danger zone for mankind.

I do not underestimate for a moment the necessity of the deterrent that we have in our inventory.

All too often, sometimes it comes, I think, from some sources, this matter with regard to testing, that it may be driving more than anything else the reliability of our stockpile. But I do not take that lightly.

I might ask a question or two, if I might, Mr. Chairman. Possibly first, probably ongoing from the remarks that I just made with regard to what is going on around the rest of the world, I would like to ask Dr. Smith and Ms. Rohlfing if you each can give us an update on progress or lack thereof since last year in securing Russian fissile materials and promoting alternative employment for Russian scientists. That has been a major concern for a long, long time.

Dr. SMITH. Senator Exon, it is a pleasure to see you, sir, and to reply to your question.

Since last year, we have made wonderful progress. I want to distinguish between what the Department of Defense does under the Nunn-Lugar legislation and what the Department of Energy does under its own legislation. We, in the Department of Defense, concentrate our aid to Russia along the lines where we have expertise; that is, strategic vehicles and nuclear weapons. The Department of

Energy concentrates its efforts where it has its expertise, which is in the production of fissile material, the manufacturing of the weapons, et cetera.

I will limit my comments to what we have been doing with the strategic vehicles and the weapons. There, sir, we have made absolutely wonderful progress. In great part this is because we have now found, located, and cultivated the Russian leadership that knows how to conduct the dismantlement of strategic vehicles and weapons in a manner that is quite similar to the way our own remarkable aerospace works.

In particular, Nicolai Schumkov has become a wonderful colleague in the planning, estimating, and carrying out of the dismantlement of strategic vehicles. John Roberto, my colleague in the Department of Defense, works quite closely with Mr. Schumkov, and it is like watching Robin Hood and Little John. They really do know how to carry out what they are doing, so that the goods and services that we provide through our contractors, particularly our prime contractors, are going extremely well. Dr. Perry is very pleased.

Once the strategic vehicles are dismantled, now we have the weapons themselves. There we work with General Yevgeny Petrovich Maslin, who is every bit Schumkov's equal in the sense of adopting and implementing Western aerospace techniques. So we know what he needs. He assists us in the overall planning. We have Russian advice on how to do source selection for the American contractors that carry out the work. We are providing everything from computers to canisters to railroad cars to actually the guillotines that chop up the bombers. We have seen Secretary Perry himself observing first the removal of warheads and then the removal of a missile and, just a few weeks ago, the actual destruction of a silo—in this case all in Ukraine.

But thanks to the ability over this past year to work hand-in-glove with what appear to be American counterparts, although they are Russians (namely, Schumkov and Maslin) I can report that we are on track, on plan, on schedule in assisting the Russians through providing American contractors to dismantle their strategic vehicles and the weapons that go thereon.

Senator EXON. Dr. Smith, thank you very much. I appreciate those remarks. This is a tremendous success story, it seems to me, primarily as a result of the leadership that you and others have given this and your counterparts in the Soviet Union. It certainly is a tribute to the major successes of the whole concept of Nunn-Lugar, that I think has been a tremendous step toward reality.

My time is up, but I want to give you a chance, with the indulgence of the Chairman, Ms. Rohlfing, to respond. Where does Dr. Mikhailov fit into all of this? Is he still the power that he always was in the Soviet Union, and has he been cooperating?

Dr. SMITH. He is more of a power today than he was last year, Senator. As you know, he sits now on the highest council that reports directly to Mr. Yeltsin.

Viktor Mikhailov is not easy to work with. But we have been effective, so that we are actually now making headway on his side of the equation, which is the equivalent of the Department of Energy. It is MinAtom, the Ministry of Atomic Energy. So we have observed on the ground, as well as through national technical means, that the storage facility that we are helping him to build is, in fact, in the ground-breaking and construction phase.

Given the conditions of winter in Russia, where the snow is often six to eight feet high, the mere fact that we have completed the design to the point where we can start the construction, and we have started the construction, is another fine accomplishment.

The reason that I did not bring up your good friend, Mr. Mikhailov is that he is not as easy to work with as Schumkov and Maslin. He has not adopted the Western approach. But that does not say that we are not working effectively with him. It just takes a lot more time and effort.

Senator EXON. Thank you. That reassures me that Dr. Mikhailov, with whom I had constant conversation, has not changed over the years. [General laughter]

Ms. ROHLFING. If I could just add to that on the Department of Energy side, actually Viktor Mikhailov is one of our principal interlocutors in our program for material protection control and accounting. We in the DOE are, from a bureaucratic perspective on our side, responsible for helping to secure nuclear materials within the former Soviet complex, so both in Russia and other former States.

We have had what I would describe as fabulous success since last year in concluding agreements with a large number of locations in the former Soviet Union. We are now working cooperatively at over 35 sites in the former Soviet Union, whereas last year, when we testified before you, we cited the success of upgrading only one facility. Just a second metric that I will offer, last year at this time we had secured approximately 75 kg of material. This year, as we come before you, we have secured tons of material and expect to secure tens of tons by the end of this year.

I might also say that we have been working multiple pathways within the former Soviet Union. We are working with both MinAtom, the defense side of MinAtom, as well as the civilian side of MinAtom. We are also working with other civilian institutes outside of MinAtom. We're also working with some of the naval fuel facilities, all within Russia. We are also working with sites outside of Russia.

So we have, I think, a very robust program and we are very proud of the progress we've made just within the last year.

Senator EXON. Thank you very much. I have some additional questions for the record that I will submit and ask that the panel respond as best they can.

Thank you Mr. Chairman.

Senator KEMPTHORNE. Senator Exon, thank you very much. You do very well with 5 minutes. [General laughter]

Senator KEMPTHORNE. I continue to learn from this man.

Senator Thompson.

Senator THOMPSON. Thank you, Mr. Chairman. I expressed many of my concerns in the beginning. Clearly, if, in fact, we're going to have less production, we need less from our production facilities. I understand that.

We have had some conversation about the implementation of START II. But past that, I wonder if we all agree that there could be a set of circumstances at the end of, say, the 7 year period, when we have built down significantly, where we would need to build back up because of whether it be the former USSR or other places around the world. I mean, can we agree on that, that that possibility is out there?

Dr. REIS. Yes.

Senator THOMPSON. I am wondering about the planning that has gone in to that possibility. Has there been any determination made as to when and under what circumstances that might need to occur and where we would need to be if that occurred? If, in fact, for example, using the facility I know more about, if at Y–12 we're down to 455 employees, in the first place why not 555 or why not 355? How was that determination made to build down to about one-fifth of what it was? Have we thought ahead far enough to determine whether or not that is going to be a sufficient basis for building back up if, God forbid, that situation arises?

Dr. Smith or Dr. Reis?

Dr. REIS. I think there is a problem with numbers here. The number of employees that we were talking about going down from is, I believe, 3,680, the current Y–12 employment, to perhaps 2,200 employees in the future. One of the things we looked at in downsizing Y–12 is what other Department of Energy jobs employees could do, particularly jobs in cleanup and disposal.

Senator THOMPSON. Decontamination and decommissioning work—

Dr. REIS. That's right.

Senator THOMPSON.—which, of course, we know there is a great deal of competition for that EM money. There are facilities out there that already need cleaning up that are not being cleaned up, and we have no idea how much of that might go to Y–12, do we?

Dr. REIS. We certainly don't at this stage of the game. But, let me make it clear, the number of employees we are talking about leaving at Y–12 doing production work was 2,200 not 450.

Senator THOMPSON. Well, those are not the figures that I got out of this (indicating). Perhaps I had better go back and look at it again.

Dr. REIS. I've got the latest figures. We looked at that very carefully, for just that reason that you described. I mean, 450 people would certainly not be enough to do even the job of START I or the continued production that we're talking now.

Senator THOMPSON. So what you're saying is at the end of the 7 year period, we would be at what level?

Dr. REIS. At 2200.

Senator THOMPSON. In production work?

Dr. REIS. That's correct, at Y–12.

Senator THOMPSON. In addition to any D&D work that might be needed?

Dr. REIS. In addition to any Decontamination and Decommissioning (D&D) work. In fact, what we have said is that D&D work might add as many as 1500 to 2000 for material disposal work.

Senator THOMPSON. All right. Back to my question. Do you think we would be where we needed to be, then?

Dr. REIS. I think you have put your finger on the hard problem, of course. It is not the facilities themselves. It is the people. Do we have the trained people and can they reconstitute the stockpile, if ever need be? Do we have a sufficient cadre not to do just what the requirement is but, indeed, to be able to reconstitute the stockpile? We have gone through that, I think, in considerable detail, and we would obviously be glad to go through that with you in a lot more detail if you wish.

Again, we have gone through this facility by facility, and in the near-term, almost and certainly component by component. Even when you're talking about the year 2010 and beyond, we still need to maintain those capabilities because, as we have talked about, the requirement is not to stop in the year 2005; it is to keep going indefinitely.

Senator THOMPSON. Right. You would agree that there would be some loss of expertise under any circumstances that would be difficult, if not impossible, to replicate?

Dr. REIS. I must tell you that across the entire complex and Y–12 is certainly a full member of that complex, it is the loss of expertise that we are most concerned about. We must maintain that expertise.

Senator THOMPSON. I believe my time has expired.

Thank you, Mr. Chairman.

Senator KEMPTHORNE. Senator Thompson, thank you very much.

Senator Frist.

Senator FRIST. Thank you, Mr. Chairman, and thank you for allowing me to participate at today's hearings because, clearly, we are at a critical juncture as we make this transition from a Cold War posture to a post-Cold War posture.

I, too, would like to address a little bit about why Y- 12, in Oak Ridge, Tennessee, under the preferred alternative proposed in the PEIS, would have a significant reduction. We can look at the specific numbers that we had been given as well.

While clearly that hurts us to some extent locally, whatever the numbers are, I, too, want to raise the question about the future ability of the United States at some point in the future to manage a safe, predictable, working nuclear stockpile. I just want to express the fear that by reducing to a low level and increasingly relying upon the weapons labs to take up the slack, we will lose our institutional knowledge, that capability, which will be very difficult to replace when the department lays off those people with those special skills and then decommissions the plant. I have a fear that we will effectively end the Nation's ability to fulfill those stockpile management functions.

I guess my question is an extension of earlier discussion. It is whether you believe that by so drastically reducing our stockpile management capability, are we going to be able to maintain that START II level stockpile?

Dr. REIS. Senator, let me respond this way. I feel if we did drastically reduce it, we would have a problem. We do not feel it is a drastic reduction. We feel the reduction will be measured out over time.

I point out that this is still a draft and we are still working on it. But, it is important for us to indicate what our preferred alternative is so people have an opportunity to comment on it and question, just the way you are questioning, whether we have gone too far or not. Many people believe we are perhaps not going far enough.

We believe we have struck a balance. Part of this was a balance between what is in the laboratories and what is in the production plants. We are working very hard now, and you will probably hear later from the other panels how to basically knit those together. The surveillance programs that we are talking about, which are new, and the new manufacturing research that we are doing are going to be both in the plants and in the laboratories. It is a balance.

Senator FRIST. Could you comment on the cost, in looking at the PEIS, on the cost and cost effectiveness of the preferred proposed alternative? Clearly, we are going to have to be in the bus of effective management of the nuclear stockpile, the hands-on as well as the manufacturing. Is there a cost advantage that you are able to calculate out that would relate to the decreasing role of the production facilities, versus the increasing role of the labs?

Dr. REIS. We looked at several different alternatives. One was moving more into the laboratories. We also looked at not doing anything.

We believe, in fact, that the reduction in the production plants—and, I think, this is demonstrated in the detailed cost analyses that were performed is the most cost effective way.

But what we are talking about is a relatively modest reduction, really, in the plants. We absolutely have to have those plants and they have to be modernized, if we are going to have the flexibility to stay at START I, to move to START II, and to be able to reconstitute the stockpile, if need be, in the future.

Senator FRIST. Thank you.

Thank you, Mr. Chairman.

Senator KEMPTHORNE. Senator Frist, thank you very much.

I have just a few wrapup questions.

I believe we have clearly established now that the Department of Energy has a budget that is based upon maintaining a START I level.

Dr. REIS. That is correct.

Senator KEMPTHORNE. Are there any assumptions in subsequent budgets that you are moving to a START II level, so that if START II is not ratified as quickly as we might think it will be, that you will not be faced with a shortfall? In other words, you are going to have a START I budget for now and for the foreseeable future?

Mr. CURTIS. Let me try to put it this way. We are planning to have the capacity to support START I, if necessary. We are not making any assumption that commits us on a START II course of action that would be inconsistent with our ability to support START I, if necessary.

Senator KEMPTHORNE. Okay. What I find interesting—and I jotted down your term, "if necessary"—is DOD I think has said it's necessary. Am I missing something?

Mr. CURTIS. No. I think the "lead" plus "hedge" strategy contemplates that we will, in fact, successfully get to a START II circumstance, but we are hedging, as we cannot take that on faith, and we must retain the capability to support a START I level, if necessary.

You are concerned that we will go beyond START II and try to reconstitute back to START I if circumstances go badly. That is not the planning assumption.

Senator KEMPTHORNE. Again, you keep putting the qualified "if necessary" in. DOD, the Secretary of Defense last week in front of this committee and Dr. Smith, said we are not going to breach START I levels. So, apparently it is necessary. So your budget is based upon a START I level and it is in the out-years as well—is this correct—so that you will not have a funding shortfall if START II is not ratified?

Mr. CURTIS. We will not have a funding shortfall if START II is not ratified and implemented.

Senator KEMPTHORNE. Okay, but there are all these qualifiers.

Mr. CURTIS. Well, I think the second qualifier is an important issue for emphasis. The question is not just a ratification of treaty; it is a demonstration that the Russian Federation is, in fact, complying with that treaty requirement.

Senator KEMPTHORNE. Gentlemen, let me ask you this. Dr. Hecker, in his prepared statement cites a "need for a DOE defense programs budget of $4 billion in 1997 for weapons activities." Apparently, based upon information you have submitted, we have a budget require of $3.7 billion.

Dr. Reis, is $3.7 billion adequate or should we be thinking more of $4 billion?

Dr. REIS. No. We believe that $3.7 billion is adequate. What you are discussing here is an assessment of risk. Clearly, if you get more funds, you would clearly get less risk; and there are certain areas where you could do that. We have discussed a number of those today and you will see it in the testimony of Dr. Hecker and others as well.

I think, as you know, the President is committed to, essentially, a $4 billion level, approximately a $4 billion level, over the next 10 years, and that certainly is sufficient to do the job that the Department of Defense has laid out for us to do.

Senator KEMPTHORNE. Director Rohlfing, there were significant increases in your budget from fiscal year 1995 to 1996. We are now seeing further increases in fiscal year 1997. Can you explain the main projects which would require such increases, tell us where you propose to have the work done, and do you believe your program takes maximum advantage of all the assets in the DOE complex?

Ms. ROHLFING. The main increase in my budget this year is in the area of Materials Protection, Control and Accounting. We will be requesting $24.2 million above last year's request in that area. For the DOE, most of the work is being performed, or much of the work is being performed in the laboratory-to-laboratory program. The money is going into equipment that is being installed in facilities in the former Soviet Union, as well as supporting Department of Energy headquarters and supporting also some of the laboratory personnel who are serving as experts in that program.

I do believe that I am taking maximum advantage of expertise within the complex. The other major share of my budget I should say is in my research and development program. My budget in that area is down somewhat over fiscal year 1996. We have a competitive process for evaluating proposals that are submitted by essentially our laboratory complex, and they are evaluated on the basis of technical merit before decisions are made to fund them.

Senator KEMPTHORNE. Thank you very much. I thank all of you.

The final comment I would make is this. I heard the very positive statements as to our program that is to keep the Russian nuclear scientists in place so that they do not find it more attractive to go to some other more country which may not be in the U.S. interest. I just hope that we are not part of an irony, because it has been made very clear in previous hearings that we do have a brain drain. We are not bringing along the next generation of scientists to our needs.

So I hope we are not funding Russia so that their generation of scientists will continue to be there and we won't have any. If that does not put us in a vulnerable spot, I don't know what does.

At some point we need to have a good discussion on that.

Senator THOMPSON. Mr. Chairman, may I ask one more ques?

Senator KEMPTHORNE. Yes. Senator Thompson.

Senator THOMPSON. This is a followup.

Dr. Reis, I hate to be one to not accept good news as an answer, but I am looking at your preferred alternative for Oak Ridge. Do you have that document? It's a two-page document.

At the bottom of the front page, it says: downsizing, which would commence around 1998 and be completed by 2005, would require approximately 455 workers for one shift operations to support a START II size stockpile.

That is what I was going on.

Dr. REIS. Our planning levels are for START I. But, even if it goes down to START II, the numbers I have—and I am looking at a similar chart—indicates approximately 2000 people.

Senator THOMPSON. Well, I think what you have done is include D&D numbers.

Dr. REIS. That is correct.

Senator THOMPSON. I believe you acknowledged that if we were down into the 400-something level, we might have a problem.

Dr. REIS. We might have a problem.

Senator THOMPSON. All right.

Thank you.

Senator KEMPTHORNE. Senator Bingaman has one more question.

Senator BINGAMAN. Yes, just one other question.

Dr. Smith, if it turns out that there is not enough money that the Department of Defense has allocated to these DOE needs to maintain the requirements of the Stockpile Memorandum, is the Department of Defense prepared to shift money from other parts of its budget to get that job done?

Dr. SMITH. Senator Bingaman, we are not only not prepared, we will not.

Senator BINGAMAN. How do you plan to explain to the Commander-in-Chief that we are meeting the needs of the Stockpile Memorandum?

Dr. SMITH. We work closely, as I said in my opening statement, with the Department of Energy to hammer out what needs to be done, and I think we have succeeded in doing that.

If we begin to fund DOE operations with DOD money, we are then beginning that slippery slope in which Defense will, in some way or other, begin to manage the weapons complex.

As a matter of policy, this administration is against such a move, and as a matter of principle, I think history supports that it would not be a good move.

So we expect to call a spade a spade. We will set forth the requirements and we will work with our DOE colleagues, as I am here today, to try to obtain whatever funds are necessary to carry out those requirements. We have achieved that today, and I see no reason why we cannot continue to achieve it in the ensuing years.

Senator BINGAMAN. Correct me if I am wrong. If there is a shortfall in money to carry out this Stockpile Memorandum, it comes from one of two places: either there is a shift in funding within the 050 account, which you have just said there will not be, or it comes out of environmental funding for environmental cleanup by the Department of Energy.

So you are saying it will have to come out of environmental cleanup by the Department of Energy ?

Dr. SMITH. That is our position, and we have made that position very clear at the Office of Management and Budget.

Senator BINGAMAN. Thank you, Mr. Chairman. That was my question.

Senator KEMPTHORNE. Thank you very much.

I want to thank the panel. You have been tremendous in your responses to us. I hope that you go away from here with the perception that all of the questions that were asked of you were friendly questions. I want to make sure that when future Americans look back on your respective tenures, that they will say it was a very positive legacy. So we want to make sure that you have the resources necessary, the policies necessary.

So, again, while we may probe, it is a friendly probe.

With that, we will take a very brief break so that our next panel can come forward. [Recess]

Senator KEMPTHORNE. Ladies and gentlemen, I will call this hearing back to order.

I want to thank the directors of the three nuclear weapons laboratories, the directors of the four nuclear weapons production plants for coming before this committee today. We truly look forward to your input.

As you know, we have asked you here to help us understand both the near term and long term infrastructure needs of the U.S. weapons research and manufacturing complex. I think, probably, based on the discussion we have just had, that you can see what we are trying to identify.

We need to plan and invest for a robust capability, not only for a future where nuclear arms control proceeds apace, but also for less favorable futures, where we may have to use our hedge and reconstitute our nuclear forces.

All of you have provided us with written statements, which I assure you will be made part of the record. So what I would like to do is go immediately to the questions, because I think we can probably get right to the meat of this if we do so.

If there is anyone who feels compelled to say something right now, I will certainly allow that. But, otherwise, I would like to just get on with the questions. [No response]

Senator KEMPTHORNE. I would like to ask each of the members of the panel to please describe their most pressing, immediate need to meet the requirements of the U.S. nuclear weapons stockpile. Are your fiscal year 1996 and fiscal year 1997 budgets sufficient to meet these near-term requirements?

Begin in any order. But first, excuse me for not doing this before. Let me announce each of you who is here.

We have Dr. Siegfried Hecker, the Director of Los Alamos National Laboratory; Dr. Bruce Tarter, Director of Lawrence Livermore National Laboratory; Dr. Paul Robinson, President, Sandia National Laboratories; Mr. Ambrose Schwallie, President, Westinghouse, Savannah River; Ms. Karen Clegg, President of Government Services, Allied Signal; Mr. F.P. Gustavson, Vice President of Defense and Manufacturing, Lockheed Martin Energy Systems in Oak Ridge; and Dr. William Weinreich, General Manager, Pantex Plant, Amarillo, Texas. With that, who among you would like to start?

STATEMENT OF DR. WILLIAM A. WEINREICH, GENERAL MANAGER, MASON AND HANGER-SILAS COMPANY, INCORPORATED, PANTEX PLANT, AMARILLO, TEXAS

Dr. WEINREICH. Why don't I start.

My name is Bill Weinreich and I am the General Manager of Pantex. With regard to your question, I can offer the following.

My workload at Pantex—which is primarily to dismantle the weapons, disassemble not only for retiring the weapons in the stockpile but also for purposes of evaluation, repair, retrofit, my workload is not decreasing in 1997. It will continue all the way through 1998 and into 1999, relative to the retirement of the weapons and the evaluation program will continue on.

Yet my workload, in addition to the mission requirements, there are some additional requirements which I have in order to meet the DOE orders and regulatory requirements.

So, basically, my workload is going up slightly, yet my budget is going down for 1997. So we are not in the downsizing mode yet, but my budget is going down in 1997 fairly dramatically, at least as I look at it.

So I would offer you that it is not sufficient.

[The prepared statement of Dr. Weinreich follows:]

PREPARED STATEMENT BY WILLIAM A. WEINREICH

Mr. Chairman and members of the Strategic Forces Subcommittee, my name is William Weinreich. I am a corporate vice president of Mason and Hanger and general manager of the Department of Energy's Pantex Plant. I have been involved with DOE weapons facilities for 11 years and with naval reactors facilities for 20 years prior to that. During this time, I have served as the general manager at Pantex. site training manager at the Savannah River site, vice president of Restoration at the Feed Materials Production Center in Ohio, and as the site manager of the Naval Reactors Facility in Idaho Falls, Idaho. I have a Ph.D. degree in nuclear science and engineering and masters and bachelor degrees of science in physics.

I'd like to take a moment here and express my gratitude for this opportunity to talk to you about the good work we are doing at Pantex Plant.

Pantex is located 17 miles northeast of Amarillo in the heart of the Texas Panhandle. It originated in 1942 as a World War II assembly plant for loading explosives into conventional shells and bombs. Since 1951, it has served as the Nation's production plant for assembling, maintaining and dismantling nuclear weapons. It is owned by the U.S. Department of Energy and has been managed and operated under contract by Mason & Hanger-Silas Mason Co., Inc. for the past 40 years.

The plant's mission addresses DOE's requirements by providing quality, on-time products and services. while simultaneously protecting the environment and ensuring the safety and health of employees and the public. In fulfilling this mission. Pantex:

- Assembles nuclear weapons for the nations stockpile
- Disassembles nuclear weapons retired from the stockpile
- Evaluates, repairs. and retrofits weapons
- Develops, fabricates, and tests chemical explosives and explosive components
- Demilitarizes and sanitizes components from dismantled nuclear weapons
- Stores plutonium pits from dismantled weapons on an interim basis.

As the final assembly plant for nuclear weapons, Pantex has traditionally played the key role in responding to the readiness requirements of U.S. nuclear policy. Through decades of change the craft workers, security personnel, technicians, staff and managers at Pantex have demonstrated the dedication, ability and flexibility to respond to both the surges in production schedules and the Congressional shifts in emphasis among various weapon systems. This responsiveness at Pantex has in large part, enabled DOE to meet its commitments to the Department of Defense and fulfill the nuclear stockpile demands of presidential policy. This responsiveness stems, in part, from Pantex employees beliefs that each of them play a significant role in maintaining a safe and reliable nuclear posture for America. I believe it is crucial that our policies and implementation of those policies continue to show Pantex employees how much we value the role they play in maintaining the security of the United States.

We've been working hard at developing and implementing contract reform initiatives set forth by the DOE, particularly related to cost reduction. In 1995, for example, we achieved a total cost savings and avoidance of approximately $31 million. This is nearly 10 percent of our total budget. We are also reducing the number of facilities required to perform our mission and we are successfully reducing inventories of hazardous material.

Safety enhancements to our facilities and operations remain our highest priority. In the past 6 years our staffing level has increased by 40 percent. This is largely due to enhancing safety and adhering to DOE standards. We continually work closely with the Defense Nuclear Facility Safety Board in reviewing and improving our safety practices.

The future of the weapons complex is being established through the Stockpile Stewardship and Management Programmatic Environmental Impact Statement. I support the concept of stockpile stewardship and management. We have been, and will continue, to closely work with the national nuclear weapons design laboratories in all our weapons work. DOE's effort to establish closer teaming and partnering relationships among the DOE, laboratories, and plants is particularly important to the future success of stewardship and management. The Enhanced Surveillance Program is a clear example of the partnering arrangement. The enhanced surveillance is a key element of stockpile management. To support the future of the complex, we clearly need to maintain manufacturing technology and capability at the plants.

At Pantex we will continue with dismantlement of weapons through 1998 and then will continue with our weapons evaluation and maintenance program into 1999. We also have initiated our enhanced surveillance activities and are implementing additional DOE requirements while our budget is decreasing. We understand the decreasing budget results from priorities and the available funds to the DOE. I have a concern about our ability to accomplish our mission and at the same time safely maintain adequate capabilities.

Throughout DOE's reconfiguration and downsizing analysis, Pantex has assessed its core competencies. Because of this, we know which capabilities and facilities are critically important in maintaining a United States nuclear Weapons capability that will meet all possible future stockpile and storage needs. We learned, incidently, from the analysis of our core competence that about 50 percent of it is comprised of facilities and equipment and the other 50 percent is the experience, knowhow, expertise and training possessed by the staff. Sustaining the core competence requires both capital investment to modernize facilities, as well as human resource investment to steward the collective competence of the staff.

Pantex has four strategically high-value core competencies that I would like to characterize briefly for you today.

The first of the four core competencies is our ability to protect the environment and the safety and health of the plant's workers and the neighboring public through our ES&H program.

> With an investment of $5 million in a Project called Stage Right, for example, we reduced the radiation exposure to staff who stage and inventory containerized plutonium pits by 95 percent while increasing our pit storage and handling capacity by an order of magnitude.
>
> Our worker radiation exposure is very low. The average annual dose to a Pantex worker is only 3 percent over the annual dose from background radiation in the United States.
>
> After 50 years of operation the Pantex site remains one of the cleanest nuclear facilities in the Nation. We recently invested $1.5 million to upgrade the air, groundwater and surface water monitoring network around the site perimeter. As a result, Pantex has more environmental monitoring stations per square mile of site area than such sites as Hanford Savannah River, Los Alamos and Nevada Test Site.
>
> Our pollution prevention program reduced the generation of hazardous waste by 98 percent from what it was 8 years ago.

A *second* strategic competence is the capability and facilities available at Pantex for synthesizing and manufacturing high explosives.

> This technical capability is core to production and assembly operations at Pantex. Synthesizing, machining and testing the explosive components of the nuclear weapons for their assembly provides Pantex with expertise necessary to handle technical and safety issues related to the chemical explosives and associated nuclear explosive safety issues that arise during maintenance, surveillance and dismantlement activities. We also manufacture and provide many specialty explosives for DOD as well as DOE.
>
> With the completion next year of a $15 million state-of-the-art high explosive synthesis facility, we will be able to replace a World War II-aged facility and greatly improve worker and public safety and better protect the environment. This facility paired with our new $20 million high explosives machining facility and the technical and safety experience of our staff gives Pantex an outstanding competence in explosives manufacture.

The *third* core competence at Pantex is safeguarding and securing weapons, materials, and Government facilities and equipment.

> We have nearly completed a 10-year, million upgrade of our physical security system which will make it the most technically advanced system in the world. The state-of-the-art physical security system combined with our award-winning best-in-class security force provides a safeguards and security core competence second to none in the world.

Fourth, and most important, is our competence in assembling and disassembling nuclear weapons safely and in staging special nuclear material.

> Since 1989, Pantex has maintained a relatively constant production rare of dismantlement during a period of continuously increasing oversight and compliance requirements. We have disassembled 15 different weapon systems totaling 10,000 weapons in the past 7 years.
>
> Our soon to lie completed $24 million special nuclear material staging facility will provide a state-of-the-art capability for the storage of strategic reserve pits.
>
> Pantex has taken an aggressive posture in the nuclear weapons complex in responding to the recommendations of the Defense Nuclear Facilities Safety Board and in implementing formal conduct of operations. We have also implemented a new seamless safety concept put forth by the DOE that evaluates each weapon's disassembly process in an integrated way.

I hope you can see from this description of our core competence that the investment we have made to improve that competence makes the Pantex Plant a unique facility in a number of ways. We have outstanding competence in the two most important support areas to operations at Pantex—ES&H and security and safeguards. We have facilities and capabilities exceeding those of any other facility in the complex for synthesizing and machining high explosives. Our ability to develop, train, manage and supervise staff who can safely assemble and disassemble nuclear weapons and who can properly store special nuclear material is second to none in the world.

Pantex had envisioned more improvements for our base of technology, but continuing reductions in funding targets will not allow us to do anything but complete our defined workload at the high performance standards that are required. Funding targets were reduced from previously established targets by a total of $45.2 million for fiscal years 1996, 1997 and 1998. We believe the overall level of funding provided by the Office of Management and Budget pass back needs to be reassessed based on actual requirements.

Pantex makes a vital contribution to the Texas Panhandle economy. We are recognized by the community for our commitment to protect the health and safety of the public and the Panhandle environment. The majority of the community knows that we are dedicated to protecting the soil and groundwater. which are the lifeblood of the Texas Panhandle. We have an approval rating in the community of 70 to 90 percent. This has been determined through independent surveys conducted by the local newspaper and several community groups. Community interest and support for Pantex is also demonstrated through regular meetings with local citizen and business leaders. and by the response of the community to public hearings about the future of Pantex such as attendance at the ongoing meeting about programmatic environmental impact statements. We had more than 450 people attend the comment session for the draft Stockpile Stewardship and management workshop. We are expecting up to 1,000 at the April 22 meeting scheduled to comment on the draft of his and other PEIS documents.

Developing future business to augment the detrimental effect of downsizing on our core competence is a high priority. First and foremost is our interest in continuing to apply our core competence to mission responsibilities of the management and stewardship of the nuclear weapons stockpile, the interim and long-term storage of the Nation's plutonium, and the ultimate disposition of plutonium declared excess to the security need. Second, is our effort to build a work-for-others program and to expand the number of cooperative research and development agreements.

The original concept of reconfiguration involved relocating functions, building new facilities and modernizing those that would continue in use. With the shin away from reconfiguration to the concept of using existing facilities on a downsized basis, few functions will be relocated because doing so is not cost effective. Simply downsizing facilities and staff to meet budget expectations is a questionable way to define future nuclear weapons production policy. Downsizing should not just be doing less of everything we previously did. As we work to downsize the Pantex activities and reduce the footprint of the physical plant, we recognize the complexity of this kind of planning because of indefinite future needs for surge capacity, enduring capacity, and U.S. security readiness requirements.

I do have a concern that the budget allocation provided to support stockpile management may not be sufficient to ensure performing our mission in a safe manner as well as enabling us to maintain and upgrade our manufacturing capability. The United States has faced this situation before when they established the nonproliferation policy. At that time, budgets were reduced significantly, thereby eliminating capital upgrades to the plants. Fernald is a clear example where capital improvements were not made as a result of reduced funds. I am concerned about the potential for that the same condition to arise today. The administration and Congress need to assure themselves that our nuclear weapons plants are maintained and upgraded so that deterioration of the facilities and forfeiture of new technology will not jeopardize our manufacturing capability or adversely effect safety systems and the environment. We need to downsize in a planned fashion to maintain satisfactory manufacturing capabilities to satisfy both safety and mission requirements.

A balanced approach to modernizing the facilities needed to design, develop, test and steward the weapons as well as the facilities needed to produce, maintain, and manage the production of reliable weapons safely is a sound approach. Pantex will continue to be the keystone facility for manufacturing, refurbishing, and extending the life time of the existing weapons, as well as, providing surveillance on the systems, subsystems, and components of the weapons in the stockpile.

Closing. Thank you for this opportunity to briefly describe efforts at Pantex that are designed to enable the plant and its staff to be able to continue the tradition of readiness we have established in responding to the needs of DOE and DOD.

Senator KEMPTHORNE. All right, thank you. Dr. Gustavson.

STATEMENT OF F.P. GUSTAVSON, VICE PRESIDENT, DEFENSE AND MANUFACTURING, LOCKHEED MARTIN ENERGY SYSTEMS, OAK RIDGE, TENNESSEE

Mr. GUSTAVSON. From a Y–12 standpoint in fiscal year 1996, we are dismantling or starting to dismantle secondaries this summer. We are receiving them back from Pantex. We are also, as described earlier, resuming our operations after a standdown in September 1994. I am pleased to say that all of those areas are resumed, or will be by the end of this month, with the exception of the enriched uranium, which of course, is the most complex.

So, in addition to our directed workload, we are doing a resumption. There is sufficient money for that in fiscal year 1996. We are discussing the scope of fiscal year 1997 with the Department of Energy and determining how soon we want to get that enriched uranium back on the line. That is an item of discussion yet in 1997.

[The prepared statement of Mr. Gustavson follows:]

PREPARED STATEMENT BY F.P. GUSTAVSON

Mr. Chairman and Members of the Strategic Forces Subcommittee: Thank you for the opportunity to testify on the Defense Programs Activities in Oak Ridge.

I want to talk today about the manufacturing capabilities that are essential to the preservation of a safe and secure nuclear weapons stockpile; the capabilities that the Y–12 Plant has delivered, and continues to deliver in support of that stockpile; and our vision of the future that will maintain our weapons requirements in a greatly downsized footprint.

The Nuclear Weapons Production Complex of today consists of four sites: Savannah River, Kansas City, Pantex, and the Y–12 Plant at Oak Ridge. These plants provide for the highly specialized material processing, component fabrication, product certification, and assembly capabilities required to support our nuclear weapons requirements. The ending of the Cold War has brought tremendous change to the world, and resulting changes in our defense requirements and missions. The mission of production of new and improved nuclear weapons has shifted to the dismantlement of warhead returns; stockpile surveillance evaluations to ensure the reliability and credibility of our nuclear arsenal; the repair of deficiencies found in these evaluations; and the safe and secure storage of nuclear weapon materials.

The Y–12 Plant has fulfilled a vital role in the U.S. Nuclear Weapons Complex for decades, id will continue to do so in the future. The secondary components for all nuclear weapons fielded by the United States were manufactured at Y–12. The Y–12 Plant's responsibility is to manufacture components that require highly specialized processing and manufacturing capabilities, as is the case for highly enriched uranium components, and procure and qualify those conventional components that are available from private industry.

The challenge for us all is how to maintain a safe and reliable nuclear stockpile with no warhead testing and no production of new weapons systems. Part of the solution is to retain the required manufacturing technologies and capabilities to fix or modify warheads when problems are identified by our stockpile surveillance programs. Manufacturing consistent, high quality parts to the rigor required in our weapons systems requires process controls, quality systems, training and experience that takes decades to acquire. It would be nearly impossible to reconstitute. Therefore, it is incumbent upon us to ensure that we carefully identify and protect the required core competencies, and ensure they are adequately exercised, through stockpile quality evaluations, replacement of stockpile units, the Enhanced Surveillance Program, dismantlement and work for other agencies and private industry.

We have developed many new and exacting systems, processes and controls that allow us to operate effectively in this very precise and demanding field. These include advanced manufacturing and inspection equipment and techniques, nuclear criticality safety procedures and disciplined operations, strict nuclear accountability and control practices, radioactive and hazardous waste processing techniques, and protective measures to ensure the safe and secure handling and storage of Special Nuclear Materials.

As the demands for nuclear weapons production and the nature of the nuclear weapons missions have changed, Y–12 has been responsive. The Y–12 facility has been engaged in downsizing since 1992. The plant contained within perimeter fences includes 600 acres. Buildings on site total seven million square feet of floor space, and historically included two million square feet of weapons manufacturing spaces. We have reduced the manufacturing floor space by over half, with further facility transitions planned for fiscal year 1997. Through the use of innovative techniques developed at Y–12, some production spaces have been converted to secure storage areas to receive weapons components being returned from dismantlements. This allows us to meet both the dismantlement requirements and avoid the necessity to build new storage facilities.

Y–12 has also met the challenge to reduce costs. In the period of fiscal year 1991 to fiscal year 1995, the Defense Programs employment at Y–12 has been reduced by 28 percent and the funding reduced by 34 percent.

During the past year, our vision for downsizing and consolidating the DP facilities at Y–12 has been reflected in the Draft Stockpile Stewardship and Management Programmatic Impact Statement (SSM PEIS). The SSM PEIS "downsizing in place" option at Y–12 for the secondaries and uranium manufacturing missions appears to be the lowest cost, lowest risk option to retain the capability to support our nuclear defense requirements. This option was selected by the Secretary of Energy as the preferred alternative last month. Therefore, the next decade will see Y–12 continue to undergo dramatic changes to reduce costs to the Government while continuing to fulfill an important, vital role in supporting the U.S. nuclear deterrent policy.

In September 1994, an operational stand down at Y–12 was initiated due to concerns about the level of discipline in operations in the plant. Since that time Y–12 has successfully embarked on a program to change our culture from an experience based environment to a procedural compliance based environment.

We resumed full operations in our Receipt, Shipping and Storage operations and our Depleted Uranium operations in September 1995, and commenced stockpile surveillance and evaluation operations shortly thereafter. Our Disassembly and Assembly operation has completed the Readiness Assessment requirements for restart and will be on line by April 1. Resumption of the remaining area, Enriched Uranium Operations, is now underway. We are working very hard with the Department of Energy Oak Ridge Operations Office to ensure that enriched uranium operations are restarted in as short a time as possible, and at minimum cost, to meet Defense Programs near term mission requirements.

I must point out, however, that operations never stopped at Y–12 over the past 18 months. Using interim "special operations" protocols developed by Y–12 and DOE, the plant was able to meet critical defense requirements, including the receipt of over 800 containers, the refurbishment of 1,200 shipping containers; the receipt, interim storage and shipment of 583 kg of nuclear materials from the Former Soviet Union under Project SAPPHIRE; the manufacture of six weapons Joint Test Assemblies; and the commencement of stockpile evaluation on seven units.

We will restart the disassembly of retired weapons secondaries in June 1996 and continue that effort through fiscal year 1997 and beyond. We are on schedule with our work on the B61–11 modification, with the first delivery units meeting the accelerated delivery date of September 1996. In addition, we will commence support of the Life Extension Program for the W–87 warhead, and will continue our stockpile evaluation and Joint Test Assembly work in fiscal year 1997 at a rate similar to fiscal year 1996.

Oak Ridge has an excellent reputation for on time delivery of products with tough manufacturing challenges. This reputation has earned the opportunity to perform precision manufacturing work for Government agencies other than DOE. Major components for the *Seawolf* submarine were manufactured at Y–12 when no other agency or private industry could do the job because of its complexity. Y–12 delivered on schedule and under projected costs. This work for others helps significantly in maintaining the technical and production competencies required for our nuclear weapons mission, but at a greatly reduced cost to the Department of Energy.

Looking ahead, Lockheed Martin Energy Systems and the Department of Energy share a vision for Oak Ridge in the year 2010. Reuse of facilities, recycling or reuse of surplus materials and the reindustrialization of Government facilities are key elements of the vision. Our plan includes the following goals:

- The consolidation of Y–12 Defense programs into a reduced footprint will be completed by 2004. The reduced footprint will be about 15 percent of historic values, and will retain Y–12 as the uranium technology and manufacturing center of excellence for the country. This reduced footprint will be sufficient to maintain our stockpile requirements.
- The dismantlement and disassembly of secondaries returned from the stockpile, and the appropriate dispositioning of materials, will be completed by the end of 2007.
- Oak Ridge Environmental Management personnel will consolidate to Y–12 as the K–25 site is reindustrialized.
- Facilities vacated by the DP consolidation will undergo safe, environmentally compliant shutdown and be available for other uses or for mothballing.
- Partnering with industry to reuse, recycle or sell materials. Utilization of surplus enriched uranium removed from weapons for commercial power reactor fuel is an example. Sale or recycle of common metal scrap is also planned in this timeframe.

In order to be cost-efficient in today's reduced funding environment, we must have successful partnering and sharing of technology and skills between all parts of the nuclear weapons complex. Y–12 is pleased to be participating in a collaborative effort with the Los Alamos and Lawrence Livermore National Laboratories in the Enhanced Surveillance Program. This technical program is an integral part of assuring the safety and reliability of a nuclear weapons stockpile which is aging beyond design expectations and previous experience.

Y–12 is essential to assuring the reliability and credibility of the U.S. Nuclear deterrent. The capabilities cannot be effectively or practically duplicated. The lowest risk, lowest cost pathway for continued assurances of these capabilities is the planned course for downsizing Y–12 while providing good stewardship of surplus materials and facilities. Y–12 has undergone significant physical and cultural change over the past few years, and the changes underway now and planned over the next decade are appropriate for the continued support of U.S. National Defense policy at a reasonable investment.

Lockheed Martin Energy Systems is committed to being a national leader; in mission accomplishment, technical and manufacturing capabilities, cost savings, and responsible environmental stewardship. In Oak Ridge, our Columbus Initiative Cost Saving Program realized $392 million in savings from fiscal year 1993 to fiscal year 1995, resulting in recognition by Vice President Gore's Hammer Award in 1995. The fiscal year 1996 goal is $100 million, with $25 million coming from Y–12. We have already identified $19 million of that amount. Y–12, in conjunction with the National Institute of Standards and Technology (NIST) was also the recipient of a second Hammer Award for the superb efforts of our metrology center in receiving NIST certification. In addition, Y–12 Plant employees received two Vice Presidential "Closing the Circle" awards for the elimination of cooling tower waste (ozone) discharges and the Y–12 Chlorinated Fluorocarbon/Halon Replacement Program.

We have a strong commitment to continue this level of performance as we pursue the vision of a smaller, lower cost, but fully capable, weapons production complex in support of our country's nuclear defense requirements. I am confident that with this commitment, and the partnerships with the Department of Energy in Oak Ridge, that we can make our vision become reality.

Senator KEMPTHORNE. Doctor, thank you very much. Ms. Clegg.

STATEMENT OF KAREN K. CLEGG, PRESIDENT OF GOVERNMENT SERVICES AND FEDERAL MANUFACTURING TECHNOLOGIES, ALLIED SIGNAL, INCORPORATED, KANSAS CITY

Ms. CLEGG. Our workload has doubled this year from fiscal year 1995. We do this in standard hours, now. It was 80,000 standard hours last year; this year we will have 175,000 standard hours of work, and next year 195,000 standard hours of work.

This does not include all that we do, for example, for Transportation and Safeguards Division products. We ship 85 percent of the nonnuclear components made for the nuclear weapons complex. I am proud to say we ship those 99.6 percent of the time on time.

Our most pressing need involves funding, not in fiscal year 1996 but in future years. We are working with Department of Energy to resolve that in 1997 and 1998. I think it is critically important, though, to understand that for the production plants, our PEIS says that we are to downsize, which we believe is appropriate and the money will be spent to restructure our physical plant so we can manufacture along process lines. But there is not long term funding that we see to capitalize on in any meaningful way so we can keep our product lines, our major product lines, current with modern technologies that the labs are developing and that the commercial market is developing.

Forty percent of our products we procure from the outside. That will increase when we downsize in accordance with the proposal we submitted to the DOE. So it is very important that we keep up with modern manufacturing technologies and infrastructure, and particularly information systems, so we can connect up with our partners here in the labs and in the production sites. But we will need money to do that.

So I am not so concerned for fiscal year 1996, but I am concerned with the out-years and for the modernization of the production plants and will there be funding available or not.

[The prepared statement of Ms. Clegg follows:]

Prepared Statement by Karen K. Clegg

Mr. Chairman, Members of the committee, my name is Karen K. Clegg. I am President of Alliedsignal Federal Manufacturing and Technologies, which manages the Department of Energy's manufacturing plant in Kansas City, Missouri. I am also President of Alliedsignal's Government services business unit, which oversees all Alliedsignal service activities for the Federal Government.

Mr. Chairman, thank you for the opportunity to appear before you today to discuss issues relating to the current and future capabilities of the DOE's Nuclear Weapons Complex.

Over the past few years, debate about the DOE's Weapons Complex has focused on how to preserve the critical functions of the national laboratories. We have had less debate about the Department's production sites, largely because the primary element of their mission—new weapons production—has been eliminated.

Today, the Kansas City plant continues to produce many nonnuclear components which are critical to the maintenance and life extension of the nuclear weapons stockpile. In fact, our plant is the only remaining fully capable, nonnuclear production resource in the Weapons Complex. The over 56,000 assemblies, subassemblies, and components we delivered last year ensure the continued safety and reliability of our nuclear weapons stockpile.

Over the past 5 years, we have been significantly downsized due to budget pressures and a reduced workload. We realized both budget and workforce reductions while absorbing additional production missions from three plants that are now closed. In 1990, over 6,800 people worked at the Kansas City plant; by 1997 about 3,300 will be employed. The DOE recently released its stockpile stewardship and management programmatic environmental impact statement which could further reduce our plant population to 2,400 by 2003. This reduction is what we proposed under the PEIS and is based on the workload assumptions of the study.

These trends challenge our ability to maintain the future safety and reliability of our Nation's nuclear weapons stockpile.

We participated in developing the PEIS and we believe the Department's plan, when implemented, will provide a responsible and adequate production base to sustain current technologies for future production needs. However, severe reductions in plant and human resources will naturally increase management risks. We will have the flexibility to respond to schedule changes, but not to significant surges in production requirements. Furthermore, there is no long-term means to recapitalize and modernize our plant for advanced manufacturing technologies.

Our ability to retain critical technologies and processes—and acquire and retain skilled human resources—is another concern. Our people must produce unique materials and precision products at the highest quality levels—consistently, reliably, and cost effectively. We are experts in manufacturing infrastructure and we take our mission seriously. Our quality system received the highest international certification level in 1995 and we have been recommended for industry's highest safety award.

To maintain our capabilities, each process line and technology must be regularly exercised. They cannot be turned off and then turned on without potential consequence to efficiency, quality or reliability. In the past, maintaining our production base was relatively easy. Now we must find ways to keep each technology and capability active and engaged even when we do not have continuous production.

In the future, we will accomplish our production mission by changing the plant's manufacturing infrastructure from a product-based system to a process-based system. Functional divisions (for example, engineering, manufacturing, and quality) will be transformed into integrated business units designed around three product technologies: electronics, mechanical products and engineered materials.

This system will provide the necessary flexibility to change product lines rapidly, adapt emerging manufacturing technologies when possible, and routinely exercise the manufacturing elements of different components and technologies. The facilities and equipment will be sized to support a stockpile at the Start I level, but will be staffed to support a stockpile at the Start II level.

However, we are concerned that there will be insufficient future funding available to keep our plant current with modern manufacturing demands. At the same time, production capabilities cannot be tabled or transferred to other sites without great costs and risks.

We had hoped that the add-on funding authorized by this committee would allow us to initiate steps to upgrade plant capabilities and prepare for the future. These actions would be consistent with the Department's long-range planning activities.

I am aware of shortfalls in funding for ongoing production operations that have raised questions regarding the use of these add-on funds. With the exception of enhanced surveillance, our add-on funding will be used for work elements previously planned for fiscal year 1996 and fiscal year 1997. We are working constructively with the DOE to identify resources for both operations and infrastructure upgrades. We also look forward to working with this committee to develop appropriate long-term solutions to the problem of sustained production plant capability.

In closing, I would like to comment on the Weapons Complex from a business perspective. In the past, the Complex has been divided along functional lines—with the laboratories in one corner, the nuclear and the nonnuclear sites and the test site in the other two corners. Given the pressures for reductions, we can no longer survive with these provincial positions.

The entire system needs to be better integrated. We need to build closer working relationships among production sites, to share management practices, improve our facilities and increase productivity levels. Alliedsignal Federal Manufacturing and Technologies is a leader in that area already, and we have much to offer the Complex.

We also need to coordinate better the activities of the production sites with those of the national laboratories. Closer alignment will strengthen our facilities and make it easier to preserve critical production technologies and capacity for the future. We have outstanding facilities at our production sites, unique equipment, and highly trained, dedicated and capable workers. I look forward to working with you to protect these assets and further develop their critical contributions to the Nuclear Weapons Complex.

Mr. Chairman, thank you again for the opportunity to appear before you today. I will be pleased to answer any questions you may have.

Senator KEMPTHORNE. So your viewpoint is funding?

Ms. CLEGG. Yes, it is.

Senator KEMPTHORNE. Dr. Weinreich and Dr. Gustavson, before I continue down the line, you have identified that there is a deficiency.

Dr. WEINREICH. Right.

Senator KEMPTHORNE. Is it in funding or if the funding is not there, is there another corrective action that could be taken?

Dr. WEINREICH. What happens in our case is we get a certain amount of funding, and you have to look at your priorities. If the funding is reduced, you take care of safety items first, then you take care of the mission items. The third thing is generally your infrastructure.

If you don't have enough funds, what happens is you start cutting back on maintenance, you cut back on some of your production capability assurance efforts. Those are the things that suffer as a result of a given amount of funds and the priorities.

I think it is incumbent upon everyone involved to go look at how that is being allocated on a priority basis. If that is the right thing to do, then so be it. But as it is not only will we not be able to adequately maintain capability, but we certainly could not modernize with the funding levels as I see them.

Senator KEMPTHORNE. Thank you.

Mr. Gustavson?

Mr. GUSTAVSON. In the Y–12 area, in terms of infrastructure, there is really a good news and a sort of good news story, I think.

We have put about $1 billion to $1.3 billion into Y–12 over the past decade. So what you have is a very competent production facility.

However, in the future, we need to insure that that infrastructure and infrastructure modernization continues to take place.

Our primary goal there is to insure that the competencies, the core competencies of Y–12 and the uranium technology, and the ability to work all the various materials that go into the secondary are retained. That is our biggest goal.

Senator KEMPTHORNE. All right. Thank you very much. Mr. Schwallie, thank you for coming back again this week.

STATEMENT OF AMBROSE L. SCHWALLIE, PRESIDENT, WESTINGHOUSE, SAVANNAH RIVER COMPANY

Mr. SCHWALLIE. It is a pleasure to be here. I just will digress for one moment.

Last week, I told you that we were going to start up the new vitrification plant for high level waste.

Senator KEMPTHORNE. Yes.

Mr. SCHWALLIE. It did happen yesterday.

Senator KEMPTHORNE. Wonderful.

Mr. SCHWALLIE. To answer your question about 1996 and 1997, from a programmatic scope point of view, we are pretty close on funding for the scope that is defined for us and outlined for us. We have held our hand up and said we could do more to contribute to the overall complex and that Savannah River has the capability to offer more to the solution.

The biggest thing I would see from a tritium point of view, to which Savannah River contributes here, is the department has invested there in the recycling/recovery activities to where we have a new facility that was started up about a year and a half ago, and it is operating fine. We are continuing to get some modernization moneys to downsize old facilities into that.

But, unlike the rest of the sites, we typically have a below the line priority basis and investment in the infrastructure issue that is not quite what I would recommend it should be. In commercial space, we would put 3 to 5 percent of our investment back every year in terms of investment upgrade.

The biggest concern from the budget trends we face is the erosion of core competency. Our people do not see a tremendously promising future in the long-term. So the attrition of core competency and the erosion of those resources is something I think we continue to need to be involved about, and it is key that we make future decisions about the roles of these sites very soon so that those people can see that a future is there or not.

From the plutonium point of view, which I think Savannah River fits into potentially here, there we are already operating facilities that on the EM side are stabilizing a lot of legacies of the past. The contribution of those facilities, in terms of plutonium handling, disposition, and perhaps as a backup to the labs for pit reconstitution and all, is something that is being talked.

There are not large moneys there, but we are working with the labs to see how we can help them increase their capability, but at the same time with them to be in a position to recommend to folks what installed capacity maybe should be put at Savannah River for any potential surge, or backup, or contingency purposes.

Of course, we are contributing in the New Production Source Program for the light water target reactor and the accelerator program. But we could always do more.

[The prepared statement of Mr. Schwallie follows:]

Prepared Statement by Ambrose Schwallie

Thank you Mr. Chairman. My name is Ambrose Schwallie. I'm President of Westinghouse Savannah River Company. We manage and operate the Savannah River Site near Aiken, South Carolina, under a contract with the Department of Energy.

It's my pleasure to be back before you again to offer the perspective of a operating plant contractor on some of the issues we face during this crucial period of deliberation on downsizing the nuclear weapons complex.

The decisions that will be made this year in terms of both budget support and the Nation's approach to stockpile stewardship and management will have a profound effect on our nuclear deterrent posture, and on the activities at the Savannah River Site.

I'll try to present a practical perspective from an operation that for 45 years has reliably and safely met the nation's requirements for production and management of defense nuclear materials. We continue to do so as we shift from the Cold War climate of the last 50 years to the new realities and challenges we face today.

As the Nation's sole producer of tritium since the first hydrogen weapon was made, the men and women at Savannah River have adjusted effectively to the new demands of a shrinking stockpile, shrinking budgets, and the stress of an uncertain future.

For example, in the absence of an immediate need for production of new tritium we've focused on recovering and recycling existing tritium for the smaller, but enduring stockpile. Our tritium operators continue their decades-old record of 100-percent on-time delivery without a single reliability problem in the field.

Just 15 months ago—in a start-up the Defense Nuclear Facilities Safety Board termed a "model" for the DOE complex our employees brought on line a new tritium recycle and loading facility that replaced a 40-year-old plant. This new state-of-the-art facility represents a major improvement in both environmental and worker protection. In fact, its environmental impact represents a 100-fold improvement over our old operations. In today's climate, environmental management—including monitoring, containment and clean-up systems—is extremely important, especially since we are storing more tritium than at any other time in the site's history.

In addition to its environmental protection and worker safety benefits, our new facility represents a significant improvement in production efficiency, and is flexible enough to meet any future surge capacity for tritium recycling or new loading. It can also be adapted for reduced demands.

The transition from the older facilities to the new underground plant was accomplished smoothly and has resulted in a more efficient operations facility. As a matter of fact, the operating budget for our tritium stockpile support activities has been reduced by almost 20 percent in the last 3 years.

We're pleased with the accomplishments we've achieved, but are continuously looking for ways to reduce our operating costs further by proposing further tritium consolidations. ROE is supporting this proposal, and we are planning for a fiscal year 1998 line item.

WithIn the next decade, it is imperative that a new tritium production source be brought on 'line to meet the needs of the enduring stockpile into the next century.

To help make this a reality, Savannah River has teamed-up with Los Alamos National Laboratory and others to pursue DOE's dual track approach of tritium production in either a new linear accelerator or in existing commercial light water reactors.

In support of the commercial light water reactor option, we're preparing for the design of a new tritium extraction facility, which will be closely coupled to our new tritium recycle plant to maximize operational efficiencies.

In addition, we're working closely with Los Alamos to demonstrate accelerator technology, and then construct a production scale plant at Savannah River should that option be chosen. This partnership leverages their R&D capabilities with our unique production and engineering know-how to make sure the program leads to an efficient production plant.

We have already begun site selection for the accelerator, and are planning to start the site specific environmental impact statement this year. Savannah River also has been assigned lead responsibility for conceptual design of the balance 'of plant systems for the accelerator complex, and we are heavily involved in evaluating and testing materials for construction.

To support other aspects of DOE's Stockpile Management Program, we're beginning to make similar arrangements for plutonium pit fabrication.

As the producer of 40 percent of the Nation's current plutonium inventory, we re working to couple our practical operational background and plutonium handling ability with the national labs' R&D capabilities and past experience in specialized pit fabrication.

Similar to the tritium program, we've suggested that DOE pursue a dual path strategy for plutonium component fabrication to ensure that we maintain appropriate contingencies while the country reshapes our stockpile stewardship posture in the post-Cold-War era.

As the Nation's lone remaining center for large-scale plutonium handling, we're providing the capability to maintain the flexibility needed to preserve important national defense options dealing with plutonium.

In that regard, we're providing Los Alamos with production and engineering expertise to help develop their capability to manufacture a limited number of plutonium pits needed to support the current science-based management program.

However, I believe a more robust and aggressive rapid reconstitution approach for pit manufacturing should be pursued as the parallel path.

We will pursue with the DOE and with Los Alamos development of a plutonium strategy that leads to a preconceptual design for a replacement pit fabrication facility, while utilizing the existing technical talents of both sites.

At Savannah River our people are uniquely qualified—along with the existing nuclear infrastructure we have in place to meet the challenge of future tritium and plutonium missions. Our people continue remarkably, to develop that operational capability even further, despite the hardship and uncertainty they face with today's difficult budget climate.

Just yesterday, we successfully started processing high level nuclear waste in our Defense Waste Processing Facility—the largest of 10 new plant start-ups we've had in the last 5 years. While it's an EM facility, the DWPF along with our extensive' nuclear materials infrastructure clearly places us as the major player in DOE missions to stabilize and dispose of the surplus nuclear material legacies of the Cold War. In fact, we currently have more major facilities operating than at any time since the reduction of East-West tensions—far more than any other site in the DOE complex.

As each of these successful start-ups are made, it revalidates Savannah River's role as DOE's most successful operating site. With Savannah River's mix of technical, engineering and operational expertise, combined with our integrated nuclear facilities and infrastructure, we are well positioned to help DOE in meeting its nuclear deterrent and non-proliferation goals.

In closing, the men and women at Savannah River have demonstrated through many accomplishments over the years their strong dedication to meeting our Nation's Security needs.

We stand ready and are committed—with your help and support—to meeting these needs well into the future.

Senator KEMPTHORNE. Mr. Schwallie, thank you very much. Dr. Robinson.

STATEMENT OF DR. C. PAUL ROBINSON, PRESIDENT, SANDIA NATIONAL LABORATORIES

Dr. ROBINSON. Thank you; Senator Kempthorne. Having been here for the whole hearing, there is no question that my top worry is what you heard, and that is assuring the reliability of the stockpile.

Sandia is responsible for the nonnuclear portion of the system, which turns out to be, by far, the greatest majority of the parts. A bomb has 6,000 parts and some of the reentry vehicles have 5,000 parts. So the assignment to be the keepers of the reliability, to publish the quality/reliability data for the entire system has been ours, and it is, I assure you, our top priority.

The difficulties, as you heard, involve parts of the whole system. The Department of Defense has limited assets of missile carriers for missile flights, limited availability of aircraft to do the tactical bombing tests to meet those quality requirements.

Similarly, at Pantex, we shut down for more than a year and are unable to take weapons back from stockpile and do the handling we need to prepare them for the reliability tests or the flight tests.

The stockpile is aging. There is no industrial experience base that fits where we've gone, particularly in the electronics, which comprise the majority of our responsibilities.

Right now in the Trident system 50 of the parts have been sunset. They were industrially specified parts. They are no longer available and are not supported by the previous manufacturer.

So we are undergoing a paradigm shift. The job used to be easier. You would design a system that would only be there for 10 to 12 years, sometimes less than that, and it would be replaced by a new one. So we talk about the analogy of the car. You would work out the problems early that might be in the design, but you could count on a good, mid-level of high performance.

We are entering unexplored territory with the aging of the systems and, just as you know, if you keep your car too long, the number of problems can escalate and you can lose control of the situation.

That same analogy is the one that worries us.

We have asked for an enhanced surveillance program to try to move from just "wait and find problems" where we look for problems from any source wherein we can find them—DOD data, our own data, plant data. But we need to start to trend and those to predict by understanding what's happening when these failures will come to get out front of them—the new assignment is to stretch out the lifetime of the stockpile—in doing that, I think the whole complex is stretched thin.

We are trying to manage a lot of change. Assignment changes have held up some of these, as I believe you have heard this morning. Funding is also a critical problem.

We talked a lot this morning about the hardware but not about the people. At the laboratories in particular, it is not just the numbers of people, it's the quality as well as the number of people. We take people with advanced degrees and have them spend 5 to 10 years enmeshed in this restricted technology that is not taught in any school—fortunately—to learn what the business is and then get in a position to try to be stewards of the stockpile.

The program over 5 years decreased by a factor of two, and we have been trying to manage that change as best we can. I assure you, we will always try to do the best job we can with the resources that we have.

But, Senator, I think we are stretched thin.

[The prepared statement of Dr. Robinson follows:]

PREPARED STATEMENT BY C. PAUL ROBINSON

INTRODUCTION

Mr. Chairman and distinguished Members of the committee, it is a pleasure to be able to testify to you today. I am Paul Robinson, director of Sandia National Laboratories. Sandia is managed and operated for the U.S. Department of Energy by a subsidiary of Lockheed Martin Corporation. We are, first and foremost, a defense programs laboratory, with responsibility for the engineering development of all U.S. nuclear weapons and for systems integration of the nuclear weapons with their delivery vehicles. National security programs and defense-related environmental programs for the Department of Energy constitute 65 percent of our laboratory's work. Our responsibilities embrace the design, certification, and assessment of the non-nuclear subsystems of nuclear weapons; safety, security, reliability, and use-control; issues associated with the production and dismantlement of nuclear weapons; surveillance and support of weapons in stockpile; and substantial work in nuclear intelligence, nonproliferation, and treaty verification technologies. We are, however, a multi-mission laboratory. Ten percent of our work supports DOE missions in energy science, research, and development. When appropriate, we also perform work for other Government agencies, particularly the Department of Defense, in programs where unique competencies, built by our mission responsibilities, can add value.

I have been closely involved with the technical management of our nation's nuclear weapons program throughout most of my career. In the early 1980s, I directed Los Alamos National Laboratory's defense programs, with responsibility for nuclear weapons research, development, and testing; stockpile maintenance; strategic defense initiatives; inertial fusion; nuclear materials and safeguards; advanced conventional weapons; and arms control and verification activities. Prior to joining Sandia National Laboratories 5 years ago, it was my privilege to serve as chief negotiator and head of the U.S. delegation to the nuclear testing talks between the United States and the Soviet Union. Those negotiations, as you may recall, produced two major agreements: protocols to the Threshold Test Ban Treaty and the Peaceful Nuclear Explosions Treaty. These were the last treaties to enter into force prior to the dissolution of the Soviet Union, but they remain in force today with the United States and Russia. Since becoming Sandia's laboratory director in August of last year, I have placed great emphasis on meeting the challenge of maintaining the nuclear weapons stockpile in these difficult budget and policy times.

On August 11 of last year, the President released a statement which included the administration's commitment to maintenance of a safe and reliable nuclear stockpile:

> As part of our national security strategy, the United States must and will retain strategic nuclear forces sufficient to deter any future hostile foreign leadership with access to strategic nuclear forces from acting against our vital interests and to convince it that seeking a nuclear advantage would be futile. In this regard I consider the maintenance of a safe and reliable nuclear stockpile to be a supreme national interest of the United States.
>
> I am assured by the Secretary of Energy and the Directors of our nuclear weapons laboratories that we can meet the challenge of maintaining our nuclear deterrent under a CTBT through a Science Based Stockpile Stewardship program without nuclear testing * * *. In order for this program to succeed, both the administration and the Congress must provide sustained bipartisan support for the stockpile stewardship program over the next decade and beyond. I am committed to working with the Congress to ensure this support.

The President attached a fact sheet to his statement that outlined a set of Safeguards, A through F, that state the conditions under which the United States can enter into a comprehensive test ban treaty (CTBT). In January of this year, in ratifying the START II treaty, the Senate included within the ratification bill a similar set of Safeguards [(c)(12)(A through F)] that also stat8 an enduring commitment to maintaining a robust stockpile:

> The United States is committed to proceeding with a robust stockpile stewardship program, and to maintaining nuclear weapons production capabilities and capacities, that will ensure the safety, reliability, and performance of the United States nuclear arsenal at the START II levels and meet requirements for hedging against possible international developments or technical problems in conformance with United States policies and to underpin deterrence.

Sandia has major responsibilities in ensuring confidence in the safety and reliability of the United States' nuclear weapons stockpile and for ensuring that this vision for the START II stockpile is achieved. I was particularly pleased when the President made his commitments to the nuclear weapons stockpile and to then see similar safeguards also embraced by the Senate. Throughout my career it has seemed to me vitally important that the Executive branch and the Congress achieve agreement on nuclear weapons issues. I have always believed that the nation is best served when its ultimate defense, its stockpile of nuclear weapons, is not the subject of partisan contention. I thus find much satisfaction in the consistency of support for our mission by both the White House and the Congress.

CURRENT STOCKPILE SUPPORT WORK

Many people suffer from an erroneous perception that the DOE defense programs laboratories have very little work to do right now. Nothing could be further from the truth. The challenges of stockpile stewardship are formidable, particularly in an era of no new weapon designs and no nuclear testing. We have several important projects underway with deliverables due in the next 1 to 3 years:

- We are currently engaged in a life extension program for the W87 Peacekeeper missile warhead.
- We are nearing completion on a quality improvement program for the B83 bomb, which will extend the service life of this weapon.
- We are developing Mod. 11 of the B61 bomb as an operational substitute for the aging B53 bomb. This is not a new weapon development program; it is a field retrofit of B61 Mod. 7 components. The Mod. 11 will ultimately permit us to retire the B53.
- We are performing modifications to other versions of the B61 to sustain the reliability scores that have been typical of these weapons in the past. At the same time, we are performing upgrades in their safety and use-control systems.
- We are nearing completion on a prototype redesign of the Safe Secure Transport vehicle used by DOE to transport weapons on the highways. The redesigned Safe Secure Transport will support DOE's growing weapon retirement program during the next several years.
- We are collaborating with the other defense programs laboratories and the DOE Pantex plant (which performs weapon assembly and disassembly) to develop methods to disassemble and dispose of weapon components safely and in compliance with environmental requirements.

Much of our current stockpile activities can be characterized as life extension work. With no new weapon developments planned for the foreseeable future. we will be required to support the weapons currently in stockpile well beyond their designed service lives. We are developing an enhanced stockpile surveillance program to help us plan our life extension activities in an optimum fashion.

The warheads and bombs that will constitute our stockpile under START II were all developed and produced within a rather limited time span; many of them contain similar parts and components and were produced with similar processes. This increases the possibility that portions of the aging stockpile could be subject to common failure modes. The enhanced stockpile surveillance program is designed to help us identify this danger early. In cooperation with the Navy Fleet Ballistic Missile Systems command, we are investigating options for coping with the design and production implications of such situations for navy weapons.

A major undertaking in stockpile life extension work is the dual revalidation program we are conducting with our sister defense programs laboratories, Los Alamos and Lawrence Livermore, under the joint sponsorship of the DOE Assistant Secretary for Defense Programs and the Assistant to the Secretary of Defense for Atomic Energy. This program will examine and update the design information for every weapon type in the stockpile, including its interface with the delivery system. Since we no longer have available the use of underground testing to validate design performance, the responsible laboratory team for each weapon will comprehensively examine the extant design data using the best design definition tools and methods available to us today. Any missing or incomplete elements in the documented design will be investigated and completed. The revised design data package of drawings, specifications, computer codes, and other documentation will then be given to a design team from a different laboratory for their critical review. In this way, two independent design teams will evaluate the design data package for each weapon in the enduring stockpile and ensure that it is complete and current with modern engineering standards, including the new computational engineering methods.

The stockpile activities I have described here are part of our enduring responsibilities in stockpile stewardship and management. As you can see, this job requires constant engineering support.

MAINTAINING PRODUCTION CAPABILITIES

Safeguard B of the Senates START II ratification bill also makes a commitment to maintaining the necessary production capabilities to support the stockpile:

> The United States is committed to reestablishing and maintaining sufficient levels of production to support requirements for the safety, reliability, and performance of United States nuclear weapons and demonstrate and sustain production capabilities and capacities.

Clearly, to ensure that the stockpile remains safe, secure, and reliable, the nuclear weapons complex must reestablish a modern production capability to repair, requalify, or rebuild warheads and bombs. This can be achieved within DOE's plan for a smaller nuclear-weapon production complex. We vigorously support DOE's program for Advanced Design and Production Technologies (ADAPT) both at the production plants and in the laboratories. ADAPT will develop an affordable design and production capability for DOE that keeps pace with manufacturing technology in industry, on whom we increasingly rely to supply weapon components.

It should be emphasized that the nuclear weapons program requires an intimate relationship between the laboratories, where the technology is developed, and the production plants that manufacture nuclear weapons. Sandia works closely with DOE's production agencies. We design or specify nearly all of the non-nuclear components of nuclear warheads. We support the production engineers at Allied Signal, Kansas City Division, who are responsible for manufacturing many of our components, and the engineers at the Pantex plant in Amarillo, where warheads and bombs are assembled or disassembled. We also produce a limited number of two kinds of components in-house, as a result of recent plant closures in the DOE complex. We have the additional assignment for manufacturing development engineering of twelve other weapon component technologies, for which we are DOE's production agent. We are working closely with industry to develop suppliers for these components.

For a variety of security, business, or technical reasons, it is impractical to rely on industry for all the components required for nuclear weapons. This is particularly true for components that are produced in low quantities and are unique to nuclear weapons. Consequently, DOE must retain an in-house manufacturing capability. To most effectively use these capabilities, new or improved processes and materials are being developed to enhance efficiency and minimize wastes, environmental impacts, and cost, and provide greater worker safety.

MAINTAINING LABORATORY NUCLEAR WEAPON COMPETENCIES

The Senate's START II ratification bill also makes a commitment "to maintaining United States nuclear weapons laboratories and protecting the core nuclear weapons competencies therein" (Safeguard C).

The nuclear weapon laboratories were created to ensure that the best technical direction would be made available to the nuclear weapons program and that technical responsibility for the stockpile would reside with identifiable institutions directly accountable to Government authority. Early on, the framers of the Atomic Energy Act decided that the technology of military applications of nuclear energy should be closely held. There is no industrial utility to this technology. This technology is not taught in the universities. The expertise for U.S. nuclear weapons resides only at these laboratories. Nuclear weapons can only be produced and their surety maintained under the supervision of these laboratories. Indeed, our confidence in the weapons that are deployed in the stockpile depends upon the continuing strong capabilities of the people who staff the DOE defense programs laboratories.

During the Cold War, a continuous stream of new weapon development programs permitted us to continuously exercise and improve our capabilities. When problems were encountered in the stockpile, we had experienced designers on hand with the skills to fix them. However, in the future, the engineers who will perform stockpile support and stockpile extension programs will not have had original weapon system design experience. We are moving from experience-based stockpile management to science-based stockpile management. This shift makes the scientific capabilities of the laboratories more important than ever.

One of the major long-term challenges we face is how to ensure reliability of an aging stockpile. We oversee the stockpile to ensure that weapons continue to be reliable, that they are safe, and that they are upgraded as necessary to maintain their capabilities until they are retired. Unfortunately, we do not possess sufficient data on how reliability declines as systems get older than about 20 years. However, it will soon be our daunting task to ensure that systems remain reliable and safe for decades beyond their designed service lives.

To do this job, we must scientifically understand the parameters of aging in electronics, materials, and structures in order to both anticipate failure paths and to provide for timely upgrades, replacements, and rebuilds. We are vigorously exploring ways of leveraging science to help meet our stockpile obligations in this regard.

Computational Modeling and Simulation

One of the great levers of science is computational modeling and simulation. Over the past two decades, advances in computer and information technologies have led to a thousand-fold increase in computing capability. At the same time, the sophistication of our computational software and algorithms for scientific problems has undergone similar increases. Nevertheless, even the commercially available and laboratory technologies of today are inadequate for the stockpile stewardship tasks we will face in the future. Another hundred-to-thousand-fold increase in capability from hardware and software combined will be required.

The Department of Energy's three nuclear weapon laboratories are undertaking a bold initiative in partnership with the U.S. computing industry and with American universities to accelerate the development of strategic computing resources required for their missions. This program, the Accelerated Strategic Computing Initiative (ASCI), builds on DOE's leadership in new computing methods and on industry's development of new kinds of supercomputers. The Accelerated Strategic Computing Initiative seeks to advance the development of computers capable of hundreds of trillions of operations per second (hundreds of teraflops) by 5-to-10 years. It will also develop a new generation of full-physics, three-dimensional computer simulation tools that are needed for our goal of simulation-driven life-cycle engineering. These tools will be developed at the three laboratories in collaboration with U.S. research universities and software firms.

The first step in the Accelerated Strategic Computing Initiative has been a partnership led by Sandia and Intel corporation to develop the world's first teraflop computer. This project, which builds on previous Intel partnerships with Sandia and Oak Ridge National Laboratories, will field a computer at Sandia in 1996 with over 9,000 individual processors tightly coupled together. It will have ten times the memory (nearly 600 billion bytes) and ten times the speed (over 1.8 trillion operations per second) of any previous machine. This computer will immediately contribute to detailed safety, aging, and nuclear performance studies engendered by real stockpile problems we are dealing with now. It will also be used by the three defense programs laboratories to develop and test the highly detailed software models needed for science-based stockpile stewardship.

Preserving Design Competencies

In my view, we will someday have to replace old weapons with entirely new systems; we cannot extend their service lives indefinitely. But replacing systems with exact replicas would neither be cost-effective nor technologically feasible. New designs for components and subsystems will be a continuing requirement which will require all the original core competencies we needed to make new weapon designs. as well as contemporary capabilities in advancing technology.

We can see from our planning charts that many of the systems in stockpile will require replacement at about the same time at some point in the first half of the next century. The engineers and scientists who will do that work are probably entering kindergarten this year. No old-timers will be around in 2025 who have had actual experience in designing a warhead. We must find ways to qualify these people. They need to work on real systems. We cannot expect them to acquire critical design skills merely by performing piecemeal component replacement work and development simulations. They have to design whole systems with real deliverables to fully develop their capabilities. Ideally. we would like to train our junior weapon design engineers alongside experienced engineers. but this will not be possible during a decades-long hiatus of no weapon development. The Russian laboratories, by contrast, will be able to pass along their critical weapon design skills to a new generation under their announced plans to rebuild thousands of weapons each year.

Strategy for the Future

It is my belief that nuclear weapons will remain important for a long time to come, and I intend to manage Sandia National Laboratories strategically so that it can continue to perform its responsibilities over the long term. We must maintain and continuously improve our technical competencies required for this work. To do so, it is my view that the following two strategic principles must be observed:

1. *We must stay current with advances in science and technology.* Managing our nuclear weapons requires advanced technology, some of which is specific to nuclear weapons, but most of which is common to the standard science and engineering disciplines. If we don't keep up with the advancing

frontiers in electronics, information science, materials science, and so forth, we won't be able to perform our mission in the long term.

2. *We must operate as a multiple-mission laboratory.* The nuclear weapons mission requires the stimulus and synergy of a multidisciplinary technical environment to be vital. The days of a high-volume nuclear weapon enterprise are over. but the requirements for laboratory excellence and a robust infrastructure remain. Only in the context of serving multiple missions can such an institutional environment be sustained.

The DOE laboratories cannot be an island: we must interact extensively with industry and universities. The technology bases for Government and commercial needs are rapidly converging. I am firmly convinced that collaboration with industry and universities is essential for the DOE laboratories' mission success. Sandia's progress in establishing mutually beneficial relationships with the private sector is evidence of substantial congruence between its essential core competencies and those of industry.

Cooperative work with industry often helps support strategic technologies that address weapons programs needs in the long term. For example. electronics technology is critical to the DOE defense mission, and it is especially important for Sandia's responsibilities in component design. Special-purpose electronic components in nuclear weapons include coded switches that prevent unauthorized use, tamper detectors, programmers that control the arming and firing sequence of the weapon, radars, and fuzing and firing sets. These devices must operate reliably over a large temperature range, survive strong mechanical shock, and be fully functional following exposure to intense pulses of ionizing and electromagnetic radiation.

DOE's requirements for many electronic devices cannot be met with commercial products. To meet its mission requirements, Sandia has developed a broad-based competency in electronics, from the fundamental science of semiconducting materials to device design and manufacturing. We can only maintain this capability in partnership with industry, and our program collaborates intensely with the semiconductor industry and universities through consortia and other arrangements. We have a 5-year, $100 million cooperative research and development agreement with the Sematech consortium, as well as several other cooperative agreements with individual semiconductor companies. These arrangements are strategically important to the weapons program.

In my view, a multiple-mission, multidisciplinary environment is absolutely essential for excellence in the DOE national laboratories. The science and technology requirements for the nuclear weapons mission are extremely broad, covering most of the physical sciences and engineering disciplines recognized today, as well as the computational and supporting technologies required for modern scientific investigation. A world-class base of scientific and technological excellence has always been the critical factor in meeting the extreme requirements placed on nuclear weapons, especially in regard to weapon safety, security, and reliability. The laboratories' ability to sustain this base has been made difficult over the last several years by declining weapon R&D funding. At Sandia, our approach to dealing with this problem has been a strategy of supporting multiple missions from a central set of core technical competencies. A strong commitment to a common set of core competencies serving the needs of, and supported by, a diverse spectrum of customers has become an essential strategy for the defense programs laboratories. It has been a critical factor in our ability to support DOE's national security mission, as well as DOE's missions in energy, environment, and the basic sciences.

TRITIUM PRODUCTION

Safeguard D of the Senate's START II ratification bill makes a commitment to "ensuring rapid access to a new production source of tritium within the next decade."

Tritium decays in stockpiled weapons and must be periodically replaced. A reliable, long term source of supply for tritium is essential for maintaining the stockpile. Without tritium, our current weapons would have no military utility. To meet stockpile needs, DOE is currently recycling tritium recovered from dismantled weapons. Based on current long-range planning assessments, we will need to have a new production facility for tritium in place before 2005. We must get started now and move quickly. We believe it is prudent policy for DOE to pursue both the commercial reactor and accelerator options. Ironically, the more technically mature method, reactor production, may be stymied by legal impediments caused by our own Government policies.

Sandia is actively supporting DOE with the technical planning and integration for tritium production using commercial light-water reactors. DOE's Idaho and Pacific

Northwest laboratories are also involved, each contributing in a particular sphere of expertise. Sandia is the only defense programs laboratory playing a major role, however, so we feel that we have an important responsibility to help make it succeed. The Savannah River plant in South Carolina also is a major contributor, and we have established a strong working relationship with them. We are able to utilize nuclear engineering capabilities that exist at Sandia in testing and infrastructure planning, and we are establishing a teamwork relationship with the other participants. Sandia is also supporting Los Alamos National Laboratory with key elements of the accelerator approach, particularly in safety, health, and environmental design issues. In addition, we have much technical experience in the design of systems for safely transporting nuclear materials, a competency that will be important in the tritium program.

The Test Ban and Stockpile Confidence

Finally, safeguard provisions E and F of the Senate's START II ratification bill reserve the right of the United States to resume underground nuclear testing to maintain stockpile confidence if warhead design flaws or aging problems occur "that a robust stockpile stewardship program cannot solve," or if the supreme national interests of the United States are at risk.

You are of course aware that the President has decided to pursue a comprehensive test ban treaty. In contemplating this decision, he consulted with the directors of Los Alamos, Lawrence Livermore, and Sandia, the nation's three nuclear weapon laboratories. We told the President that we felt we could meet the challenge—and it will be a challenge—of maintaining the nation's nuclear deterrent under a comprehensive test ban *if* we vigorously pursue a program of science-based stockpile stewardship. We did not guarantee that we can meet that challenge in the absence of a strong commitment to science-based stockpile stewardship. This commitment will require sufficient funds to support the core program for maintaining the stockpile as well as an Investment in special facilities required to perform our work in the absence of underground nuclear tests.

Today's budget hearing is unique in that we have not yet received a final budget mark to know whether an adequate level of funding will be provided to support the nuclear weapon programs. Science-based stockpile stewardship represents the soundest approach of which we are aware to ensure a safe and reliable stockpile without carrying out nuclear tests, and I committed our laboratory to do all that is humanly possible to make it succeed. While we in the laboratories will do our part, we have no chance of succeeding without adequate financial support. We were realistic in telling the administration that the quest to find a substitute for the role of nuclear testing cannot be pursued without an increase in funding, and I was satisfied with the President's commitment and support for the science-based stockpile stewardship initiative. The President made three commitments in this regard: adequate funding, an annual joint review of certification, and identification of "the maintenance of a safe and reliable nuclear stockpile" as a "supreme national interest of the United States."

I urge this committee's close attention to these issues. Although we have not received a budget mark for fiscal year 1997, there are many people in the administrative/budgetary line between the laboratories and the President. It is important that these individuals, all of whom are faced with difficult budget tradeoffs in this year of decreasing Federal expenditures, not fail to fulfill the President's commitments. I assure you that this is also a question in which great care must be taken so we do not sacrifice the nation's future security by allowing the U.S. nuclear weapons stockpile to erode while we attempt to find ways to maintain confidence in our weapons without nuclear testing.

Radiation Effects Testing Through Laboratory Simulation

Ensuring confidence in the stockpile without nuclear testing will be especially challenging for the nuclear design laboratories, Los Alamos and Lawrence Livermore, because some aspects of nuclear explosives design are still not understood at the level of physical principles. Sandia is in a somewhat better position for fulfilling its responsibilities without nuclear testing because our design responsibilities include only the nonnuclear subsystems. We are still able to test in valid ways the electronic subsystems that must function reliably to ensure the safety, security, and controlled use of all U.S. nuclear weapons.

Nevertheless, we do have a continuing responsibility to assure that a warhead's electronic systems are viable in the extreme radiation environments of nuclear explosions. In the past, we have relied on nuclear testing for such assurance. However, over the past 30 years we have developed unique high-energy accelerators that permit us to simulate almost all of those radiation conditions in the laboratory. Thus, the steps to achieving substitutes for the full range of underground radiation effects tests of the past are underway in our science-based stockpile stewardship plan.

The requirements for such radiation sources include radiation sciences, ablation and implosion physics, and radiation flow phenomena. Progress has been steady over this long period through advances in engineering and science, but our progress has been spectacular during the last year as a result of our improved diagnostics and theoretical understanding. In recent experiments on Sandia's Saturn accelerator, we were able to create a one-half-million-joule x-ray source in a large-volume cavity and use that source in experiments with Los Alamos for radiation physics experiments. This result is particularly remarkable when you consider that the energy source was only 5 million joules and the conversion to a variable pulse x-ray source was 10 percent. The Saturn accelerator operating with an electrical power of 20 trillion watts was able to compress the pulse through an imploding plasma to achieve an x-ray power of 85 trillion watts! This result has been modeled by Lawrence Livermore National Laboratory.

We predict that our results should be substantially improved by applying the same approach on the larger Particle Beam Fusion Accelerator (PBFA) accelerator later this year, giving over 1.5 megajoules of X-ray output. If this step is successful, then we can begin to study issues of implosion symmetry and stability using this powerful and efficient source of x-rays. If that vital scaling step is successful, we think another factor of four in energy should be achievable in a fairly short time (5–10 years) with a reasonable expenditure (approximately one hundred million dollars). A modular building block of this advanced accelerator will begin operating this year, and when combined with the joint experiments with Los Alamos and Lawrence Livermore National Laboratories on the PBFA accelerator, we should have the basis for a decision on whether to proceed with this next step in order to produce hundreds of trillions of watts of radiation in the laboratory.

Radiation effects are already one example that can be put forward as a science-based alternative to testing. This initial success should give us hope, although it can not yet give us assurance, that a program to replace underground nuclear testing with laboratory experiments can be successful.

Inertial Confinement Fusion (ICF) and Treaty Limitations

I am concerned that some recent policy discussions regarding the content of a comprehensive test ban treaty could restrict the laboratories' ability to conduct an adequate stockpile stewardship program in the absence of testing. If the Arms Control and Disarmament Agency decides to seek provisions in a test ban treaty that restrict inertial confinement fusion (ICF) to *only* laser and particle beam drivers, based on the negotiating record of the 1975 Nonproliferation Treaty, then other methods of driving ICF, some of which are being aggressively developed here and abroad, would be treaty violations.

Some would have the United States take the extreme position that inertial confinement fusion is incompatible with a zero-yield policy. This contention has been thoroughly studied in the past and found to be without merit. The yields of ICF are so small that they fall well within the intent of a zero-yield policy, and they certainly do not present a proliferation threat. Further restrictions on ICF are not at all necessary for the purposes of the testing treaty. Moreover, inertial confinement fusion is recognized worldwide as an important experimental tool for the study of high-energy-density physics.

If the ICF language of the 1975 Nonproliferation Treaty were to be carried over to a comprehensive test ban treaty, some of the high-energy accelerators the laboratories use today to simulate a variety of radiation conditions, and some that will be needed in the future, would have to be abandoned. Such restrictions were not part of the laboratory directors' understanding when we told the President we could perform our missions without underground nuclear testing. Our clear expectation was that further limitations would not be placed on our ability to employ the various approaches to inertial confinement fusion in support of the stockpile stewardship efforts. In my view, it is essential that inertial confinement fusion be permitted under a CTBT without such restrictions.

Non-nuclear Stockpile Assurance Testing

At Sandia, we also assure stockpile confidence through non-nuclear assessment. This stockpile evaluation activity involves both laboratory and flight testing of stockpiled weapons, as well as designing test equipment and monitoring test performances. Test results that identify deviations from weapon performance standards are thoroughly investigated and may result in recommendations for stockpile improvement programs.

Joint testing of weapons in their delivery modes is performed in cooperation with the Department of Defense. We have recently become concerned about DOD budgetary constraints and other complications within the DOE weapons complex that affect the ability of the laboratories and the military services to support the joint DOE/DOD Stockpile Surveillance program. Difficulties in reconfiguring stockpile weapons at Pantex, while the facility was prohibited from operations under restraints of the Defense Nuclear Facilities Safety Board, delayed certain tests for significant periods. For several years Sandia has also been concerned over possible Air Force strategic missile testing shortfalls that could impact the reliability and credibility of W62, W78, and W87 warheads. A recent Joint Test Working Group meeting between the testing organizations of the departments of Energy and Defense has heightened that concern. Moving from multiple to single reentry vehicle configurations, eliminating Peacekeeper flight testing, and a decision not to combine reentry vehicle and warhead telemetry tests, are developments that reduce flight opportunities for nuclear warhead surveillance.

A similar test support problem may be developing for tactical bombs (B61 Mods. 3, 4, and 10). At a recent Air Force scheduling meeting of DOE, Sandia, and Air Force test organizations, it was revealed that no funding will be provided by the Air Force to support the tactical aircraft and range resources required for nuclear bomb test drops beginning this year.

My concern over these issues is based on Sandia's 40+ years of test experience with nuclear warheads. We have sized our stockpile surveillance program to yield results within significant parameters. This requires us to test eleven warheads per year of each type. Generally, conducted jointly with the military. From a study of historical warhead data, we find that approximately 22 percent of the defects discovered in tests are flight-unique; that is, if we don't do flight tests we will likely not see that portion of defects within the system. Given the stringent reliability requirements that nuclear warheads must meet, we have determined that the minimum requirement for warhead flight tests is in the range of two to four per year.

We believe that a nuclear warhead assurance program that does not perform flight tests, or performs fewer flight tests than the minimum required, would lack a credible basis for evaluating system reliability. The credibility of reliability testing diminishes as the number of flight tests decreases. Erosion of credibility in our reliability testing program is serious, and would directly undercut the maintenance of confidence in the stockpile. I urge you to ensure that funding to support the joint flight test capabilities is maintained at an adequate level.

SUMMARY AND CONCLUSION

Sandia National Laboratories and our sister laboratories have a central and critical role to fulfill in DOE's stockpile stewardship and management program. It is our job to assure confidence in stockpile safety and reliability and help DOE create an effective and efficient production complex for the smaller stockpile of START II. We are dedicated to providing the engineering leadership to provide for long-range support of the enduring stockpile as it ages and as old technologies are superseded by new ones.

To do this job, we must sustain a robust core capability in the scientific and engineering disciplines required to respond to emerging and unforeseen challenges relating to nuclear weapons. Yet today that core capability is threatened by erosion of the budget support that we and the White House had agreed were essential to maintain the nuclear stockpile as a supreme national interest of the United States. This comes after a 5-year budget trend that reduced the core nuclear weapons funding by nearly half. Similarly, we face other policy challenges ranging from the ability to produce tritium in commercial reactors to the prohibition of certain laboratory experimental facilities under new treaty restrictions.

Our laboratory stepped forward to sign up to the challenges of a new future in which the ultimate security of the nation will be bet on a program of science-based stockpile stewardship, without nuclear testing, rather than on the paradigms of the past. In truth, we are in a precarious position today throughout the nuclear complex to try and meet these challenges without adequate support to carry out the many complex tasks necessary to maintain the vital responsibilities which we must perform for the Nation.

Senator KEMPTHORNE. Dr. Robinson, thank you very much. Dr. Tarter.

STATEMENT OF DR. C. BRUCE TARTER, DIRECTOR, LAWRENCE LIVERMORE NATIONAL LABORATORY

Dr. TARTER. Thank you. To try to be very specifically responsive to your question, I think my greatest need for this year and for next year, or the greatest need within the laboratory, is for a perception of a strong, decade-long and longer commitment to the program as basically put forth. I think that is the issue which speaks to Paul's comment about the people.

If I had reasonable assurance of decade-long support for the program into the future, then I think I could manage a lot of things very, very well and effectively within that system. So that commitment to me is extraordinarily important, and I think after the period since the end of the Cold War, that is something which all of the institutions, from the laboratories and the plants, have been hard to get a sense of.

I think one of the strengths of the current plan is that it puts a blueprint down which evolves, but it, nonetheless, has a direction and a focus to it which, if we can have some sense of assurance of it, I think we can begin to manage very well towards the goals you have heard expressed this morning.

Very explicitly, as Paul said, we are stretched thin. I think infrastructure at the laboratories and plants obviously can use modernization. My own choice of where to put additional emphasis and resources would be on in the area of enhanced surveillance, on trying to find things out about the aging process, which I think is the driver and where leverage is in both the need for a certain level of production and how reliable and long a stockpile will last.

So I think there is money being made in that area.

I think the other thing we can do over this coming year, which we have begun, is this. Over the past perhaps year to 2 years, we have achieved a greater sense of single integration among the laboratories. We have begun that work with the manufacturing facilities, but we have not reached the same level of maturity.

I think perhaps a year from now, when we return to this place, you ought to see a greater sense of partnership that has developed among the various components of this system to make it a single program.

Those are my particular issues.

[The prepared statement of Dr. Tarter follows:]

PREPARED STATEMENT BY C. BRUCE TARTER

INTRODUCTION

Mr. Chairman and Members of the subcommittee, I am the Director of the Lawrence Livermore National Laboratory (LLNL). We were founded in 1952 as a nuclear weapons laboratory, and national security continues to be our central mission.

I am here today to support the Stockpile Stewardship and Management Program being pursued by DOE Defense Programs at the three national security laboratories (Livermore, Los Alamos, and Sandia), the Nevada Test Site, and the production facilities in the nuclear weapons complex. I intend to highlight how Livermore fits into this highly integrated program whose goal is to maintain confidence in the safety and reliability of the enduring US nuclear weapons stockpile. I am also here to support another aspect of our global security work—our important contributions to national efforts in nonproliferation, arms control, and international security. Largely sponsored by the DOE Office of Nonproliferation and National Security, these analytic, policy-support, and technology-development activities build on and reinforce nuclear expertise resident at Livermore. We are a "full-service" nuclear weapons technology laboratory—committed to both maintaining the enduring US nuclear weapons stockpile and dealing with the dangers posed by nuclear proliferation in the post-Cold War world.

During this past year, the President reached two critical decisions that established the course for future nuclear-weapons activities in the United States. First, the President announced on August 11, 1995, that the US would pursue a Comprehensive Nuclear Test Ban Treaty (CTBT) with no permitted nuclear weapon test explosions. In making that decision, he reaffirmed the importance of maintaining a safe and reliable nuclear weapons stockpile. Then, on September 25, 1995, the President directed necessary programmatic activities to ensure stockpile performance:

> "To meet the challenge of ensuring confidence in the safety and reliability of our stockpile, I have concluded that the continued vitality of all three DOE nuclear weapons laboratories will be essential * * *. In accordance with this conclusion, I have directed the Department of Energy to maintain nuclear weapons responsibilities and capabilities adequate to support the science-based stockpile stewardship program."

The mandated science-based Stockpile Stewardship and Management Program is a cost-conscious, integrated response to several highly significant changes since the end of the Cold War. It includes *enhanced stockpile surveillance* because the enduring stockpile is smaller, continues to grow older, and includes fewer types of weapons. To compensate for no nuclear testing, it includes a *revalidation process* to assess stockpile performance when physical changes are noted (or predicted) and to devise and validate remedial actions when they are needed. This process relies on a more fundamental understanding of nuclear weapons issues, better nonnuclear experiments, and more sophisticated computer simulations. In addition, for a production complex that is currently in need of modernization, the Program includes *an agile manufacturing capability* to refurbish and replace aging and defective components in an affordable and environmentally-responsible manner. Finally, the Program also includes the supply of tritium for weapons.

The Stockpile Stewardship and Management Program is a major technological undertaking that requires the integrated efforts of all aspects of the weapons complex. It also requires adequate investment—on the order of billion per year for a decade—and flexibility to achieve a proper balance among the aforementioned program elements. Maintenance of confidence in the reliability and safety of the stockpile will suffer if we overinvest in one area at another's expense. There is no single "silver bullet" which can supersede the full set of integrated needs. Greater funding would increase the likelihood that this very challenging Program will succeed; conversely, less funding will increase risks. It is exceedingly important that we have a strong start in the early years to ensure the Program's success.

Program success also requires effective partnerships among the laboratories and between the laboratories and the production facilities. For the taxpayers' benefit, we must ensure that the special skills and unique facilities existing at one site are used efficiently to help work issues at another site. My testimony will include examples of partnerships that Livermore is pursuing with the other laboratories, with the Nevada Test Site, with the Y12 Plant, with the Department of Defense, and with American high-technology industries.

Livermore's global security responsibilities extend beyond stewardship of the Us nuclear weapons stockpile. In his statement about a CTBT on August 11, 1995, the President emphasized the importance of pursuing:

> "* * * a comprehensive research and development program to improve our treaty monitoring capabilities and operations [and] continuing development of a broad range of intelligence gathering and analytical capabilities and operations to ensure accurate and comprehensive information on worldwide nuclear arsenals, nuclear weapons development programs, and related nuclear programs."

The proliferation of weapons of mass destruction represents a major challenge to our national security, and countering this threat requires a multi-pronged approach. DOE and its laboratories provide expertise and technology to support arms control policy development, arms control verification, and intelligence analysis of nuclear weapons activities worldwide. Livermore has played a very prominent role in these efforts, and we are undertaking leadership roles to counter the emerging threats of nuclear smuggling and nuclear terrorism. To help prevent theft of nuclear materials, we are also heavily involved in activities to improve fissile material control and facilitate nuclear weapons dismantlement in Russia.

The technical issues we face in stockpile stewardship and management and in nonproliferation and arms control are extremely challenging. They place significant demands on Livermore's scientific and engineering excellence. I will discuss each of these mission areas in turn, with examples of partnership activities and new initiatives. I will then mention some laboratory management issues and close with a short summary.

STOCKPILE STEWARDSHIP AND MANAGEMENT

The DOE Stockpile Stewardship and Management Program

The Assistant Secretary for Defense Programs has led the Department, its three national security laboratories, and other sites in the weapons complex, in the development of the DOE Stockpile Stewardship and Management Program. A report summarizing major features of the Program was published in May 1995, and a draft of the programmatic environmental impact statement (PEIS) for the Stockpile Stewardship and Management Program was just issued at the end of February 1996. Current capabilities and facilities, requirements, and cost efficiency combine to drive the overall architecture of the Program and to define necessary long-term investments. Additional efforts are underway to complete necessary detailed roadmaps based on requirements set forth by the Department of Defense.

The Stockpile Stewardship and Management Program calls for radical changes—any already underway—in the manner in which the weapons complex conducts business. It entails cost-cutting, making necessary investments, and adjusting to new circumstances: fewer weapons, fewer types of weapons, no production of new types of weapons, an aging stockpile, a production capability in need of modernization, and no nuclear testing. In addition to the supply of an adequate amount of tritium for weapons, the Program consists of three major elements to support a small, enduring nuclear stockpile:

- *An enhanced surveillance program to understand and predict the effects of aging.* An enhanced surveillance program does not mean simply more surveillance; it means smarter surveillance. With fewer types of weapons in the stockpile and much less capacity to work on weapons in the production complex of the future, we must become more proficient at detecting potential problems early to provide adequate time for reanalysis and action, if necessary. This calls for research and development activities in three areas:

1. We must improve data bases on the performance of stockpiled weapons so that we can ascertain when observed behavior in aging weapons is anomalous. These activities include building a modern nonnuclear experimental data base for stockpiled weapons. Many of the nonnuclear experiments on the systems were done 10–15 years ago. Today, much better techniques are available. In addition to these new experiments, we need to make existing archival data more accessible and useful to stockpile stewards.

2. We must improve the sensors and techniques used to inspect stockpiled weapons. For example, new nondestructive evaluation techniques, such as acoustic, X-Ray, and neutron tomography, can reduce the number of weapon components that must be destructively tested. Other advanced sensors are being developed—most with industrial collaboration—to enable continuous monitoring of key aging signatures within stockpiled weapons.

3. We must develop a better understanding of how aging affects the physical characteristics of a material and the resultant impact on weapon reliability and safety. Our pursuit of the "science of aging" entails activities such as molecular dynamics modeling on computers and atomic force microscopy to look at the effects of corrosion on an atomistic level. We are in the process of establishing an enhanced materials database (using surveillance and dismantlement data) and developing sophisticated computational techniques to better analyze these data.

By using the data from the enhanced surveillance program to predict component lifetimes, a more systematic refurbishment and "preventative maintenance" program—rather than an expensive and high-production rate replacement program—will be possible. These scientific efforts are the key to an affordable manufacturing capability in the production plants (discussed below).

- *A revalidation process—backed by a set of new experimental tools—to support high-confidence assessment and certification when issues about stockpile performance occur.* The Stockpile Stewardship and Management Program includes a comprehensive assessment program to address issues that arise from the enhanced surveillance program and to evaluate the significance of observed and predicted aging processes. This program also reviews the viability of options for refurbishing or replacing specific warhead components and the viability of new production and fabrication processes and materials.

These efforts are to be tied to formal processes with the DOD for assessing stockpile weapons and modification actions. A joint DOD/DOE Dual Revalidation Program process has been developed. It was confirmed by the Nuclear Weapons Council, which directed that the W76 be the first weapon reviewed. We are currently working on establishing a Joint Certification Program with DOD to formally certify weapon performance after necessary stockpile modifications.

The quality of these revalidation activities depends on the competence of technical staff at the national security laboratories and their judgments. As the scientific underpinning of revalidation, they will have to rely on numerical simulation with advanced computer models and above-ground nonnuclear testing in more capable experimental facilities. Science-based stewardship will have replaced nuclear testing as the means to assure confidence in the reliability, safety and performance of stockpile.

Important components of the scientific backing for the revalidation program include the Accelerated Strategic Computing Initiative (ASCI), which is discussed below, and new experimental facilities to be constructed. These include the National Ignition Facility and the Contained Firing Facility at Livermore, the Dual-Axis Radiographic Hydrodynamic Facility and the Atlas Facility at Los Alamos, and the Process and Environmental Technology Laboratory at Sandia. These scientific frontier-expanding investments will both provide essential data for stockpile stewardship and maintain expertise unique to nuclear weapons in a staff that will increasingly have no nuclear test experience.

- *A small, efficient manufacturing capability to refurbish and replace aging and defective components.* The production facilities of the future must be agile and highly capable, yet affordable. With cost constraints and the planned much smaller stockpile of the future, the focus will be on capability, not capacity. Choices of production technologies will emphasize flexibility and will utilize modern commercial methods wherever possible. Clearly, there must be a much closer tie between research and development on remedies to problems that arise in the stockpile and manufacturing capabilities at the plants.

The Stockpile Stewardship and Management Program calls for integration of weapon components development with the required system engineering and associated manufacturing and materials processes. This concurrent engineering approach will reduce costs and provide flexibility to respond to potential needs rapidly. Its success depends on our ability to develop computer-based models of the performance of replacement weapon components and on our ability to simulate associated manufacturing processes so that we can study trade-off options efficiently and quickly. In support of this overall effort, the nuclear complex-wide Advanced Design and Production Technologies (ADaPT) initiative is developing techniques and technologies needed to develop new and innovative manufacturing processes that reduce cost, improve efficiency, and reduce waste production.

Several factors work to integrate the three major elements of the Stockpile Stewardship and Management Program just described. First, the laboratories and plants are developing comprehensive life-extension plans for each weapon system slated for the enduring stockpile. These plans integrate enhanced surveillance, revalidation, life-extension manufacturing activities on a weapons system by weapons system basis, and time-phase all of the activities (to the extent possible) to balance the workload. Second, each of the major elements entails substantial partnership efforts among the laboratories and between the laboratories and the production facilities. It is a shared effort requiring the special skills and capabilities and the unique facilities at each site in the complex. Finally, the Stockpile Stewardship and Management Program is only as strong as its weakest link. The effort devoted to each of the three major elements must be appropriately balanced. To increase planned funding at one site—or in one program element—at the expense of necessary activity at another will damage the overall Program.

The LLNL partnership role in Stockpile Stewardship and Management

LLNL has worked closely with Defense Programs to develop the DOE Stockpile Stewardship and Management Program, and we are highly supportive of this effort to create the necessary scientific and technical basis for stewardship in an era of no nuclear testing. We are an active partner in the Program because of the stockpile responsibilities we have, and because of our special skills and capabilities and the unique user facilities that exist at Livermore. Our partnership efforts in Stockpile Stewardship and Management include many cooperative activities with the other DOE national security laboratories, with the Nevada Test Site, with the production 4facilities in the weapons complex, with the Department of Defense, and with various American high-technology industries (most notably computations, lasers, high-speed instrumentation, and high-precision optics). Examples in each of the three major elements of the Program follow:

Enhanced Stockpile Surveillance. A critical issue in enhanced surveillance is the development of a better understanding of how aging affects the physical characteristics of a material and how these changes impact weapon reliability and safety. With a better understanding of aging, our enhanced surveillance program can be more predictive, which would enable systematic refurbishment and "preventative maintenance" activities-rather than expensive and high-production-rate replacement activities when aging effects have a severe impact on weapon performance.

There are many different types of materials in weapons whose aging effects must be better understood. Some are organic compounds, such as high explosives, which can be expected to degrade over time. By comparison, plutonium is a much more stable material in weapons; however, its properties are among the most complex of all the elements. In addition, if remanufacture of plutonium parts is required, long lead times will be necessary because of the limited capacity the system will have. To understand the performance of an imploding pit of a stockpiled weapon, we need to know much more about aged plutonium—its microstructure and its equation of state at relevant temperatures and pressures.

We are conducting a variety of experiments to obtain better data on the properties of plutonium. Some of these activities, such as our diamond anvil experiments, can be pursued in the laboratory with minute quantities of plutonium under highly controlled conditions, and we are working at facilities at Brookhaven National Laboratory to field such experiments. Other activities need to be conducted at the Nevada Test Site (NTS). We are working in partnership with NTS and Los Alamos to execute a series of subcritical experiments to study the properties of plutonium shocked and accelerated by high explosives. The first experiments are scheduled for later this year.

In these experiments, we will study a number of important properties of plutonium and generate data that can be used in our computational models. Sophisticated diagnostics, including the use of laser holography, will allow us to gather information about the plutonium equation of state at conditions similar to those during weapon implosion. We will also measure properties of the ejecta that comes off an accelerated plate of plutonium as a function of surface finish and other important properties. This will help us understand and better model the phenomena of mixing, which affects the performance of primaries in stockpiled weapons.

A Science-Based Revalidation Process. Decisions about the stockpile must be grounded in experimental reality and simulations using detailed, calibrated computer models. At Livermore we operate state-of-the-art experimental facilities for the integrated complex, including the High Explosives Applications Facility (HEAF), the Flash X-Ray facility at Site 300, and the Nova laser system. This past year, for example, weapon scientists from Livermore and Los Alamos conducted more than 200 experiments with the Nova laser to study hydrodynamic instabilities and mixing, material opacity, equations of state, and other aspects of weapon physics. These experiments generated important information about the physical processes occurring in nuclear weapons, and their results provided essential feedback and information for our physics computer codes.

A critically important thrust in the science-based revalidation process is improvement of the computer models we use. Numerical simulation and computer models, benchmarked with historical nuclear test data and results from laboratory experiments, will be the principal tools for assuring stockpile performance in the future. In the absence of nuclear testing, we need more realism in the computer simulations—improved models of physical effects, greater resolution, and use of three spatial dimensions to model unsymmetrical physical phenomena (such as those produced by aging effects). This calls for a 10,000- to a 1,000,000-fold increase in computer speed and data storage capacity.

The objective of the Accelerated Strategic Computing Initiative (ASCI), a central element in the Stockpile Stewardship and Management Program, is to vastly improve the high-performance computing capability at the national security laboratories. ASCI is a research partnership in which the laboratories have begun to work with industrial firms to develop technologies—including software, data storage, and communications environments—that address the specific problems of the highest-end weapons physics models. Multiple vendors may participate in various partnerships, yet each partnership will proceed in a way that ensures portability of major weapons codes between platforms.

The proposed ASCI budget in fiscal year 1997 is $122 million, a sizable fraction of which is intended for procurement of prototype high-end supercomputers from American industry. We will be buying—and working with our industrial partners to debug, refine, and improve—computational capabilities which should reach the commercial marketplace 10 years hence.

Our research partnerships with the computer industry will build on the "business plans" of the vendors. The building blocks of our supercomputers will be "off-the-shelf" processors. These "commodity" parts range from single-processor building blocks to shared-memory systems with 8 to 100+ processors. ASCI is not intended to drive processor development. That is a $100 billion industry. Rather, ASCI intends to build on the "business plans" of the vendors-how they intend to cluster the commodity building blocks into systems with ever-increasing capability. These partnerships will expedite the process. We will obtain computing capabilities that we need for stockpile stewardship and management. Industry will obtain for their prototype computer systems sophisticated customers who can help refine concepts and develop necessary software.

One approach to more powerful supercomputing follows the path of the current state-of-the-art supercomputers at the national laboratories—single massively parallel processing (MPP) machines, with large numbers of individual nodes each with its own memory, tightly coupled via a custom, high-speed network. Some software applications work exceedingly well in an MPP architecture; others present difficulties which are yet to be overcome even on small scale machines. Complementary approaches to more powerful supercomputing use as a building block shared-memory processors (SMPs). Here, the challenge for ASCI is the seamless integration of a large number of these SMP machines to create the capabilities we need. As the individual SMPs represent the high-volume segment of the commercial market, this general approach will benefit from a much richer software environment.

We have already initiated one research partnership to provide a "TeraFLOPS" supercomputer by end of calendar 1996. A "TeraFLOPS" supercomputer performs a trillion floating-point operations per second, which, operating at even a modest 10 percent efficiency, represents a 1,000- to 10,000-fold improvement over the capability of our best current supercomputer. This will allow us to perform some 3D hydrodynamics calculations coupled with radiation transport, which is an important but modest program milestone. We are in the process of soliciting two additional research partnerships, each to provide a "several-TeraFLOPS" supercomputer by the middle of 1998. Our fourth partnership is envisioned as a "10-TeraFLOPS" capability in the year 2000.

The three laboratory sites will each provide both open and secure "TeraFLOPS" capability. It is anticipated that the primary secure usage will be local. However, the research nature of the ASCI partnerships requires seamless remote access for some fraction of the ASCI applications development teams. Open, remote access is also necessary to foster effective working partnerships with research universities and other centers of excellence for high-performance computing.

Our strategy of pursuing multiple approaches and creating multiple industrial research partnerships is aimed at accelerating existing performance trends to meet our specific needs. It is not possible to predict which technology path will lead to the best results; indeed, it is unlikely that a single technical approach will serve all program requirements. Therefore, the research partnerships must overlap both in time and in technical approach in order to achieve high payoff with manageable risk, ensure flexibility, avoid dependence on single vendors, and serve diverse program needs.

An Agile Manufacturing Capability. LLNL is developing technologies to provide cost-effective manufacturing capabilities to replace aging weapon components or refurbish them to extend their life. This is an urgent need. In the near-term we must be capable of replacing any questionable components to important weapon systems—even as the production capability is being restructured to be consistent with future stockpile needs. Some of our manufacturing and refurbishment efforts entail making effective use of industrial partnerships to pursue technologies in precision fabrication and non-destructive evaluation. These activities, which are part of the nuclear weapons complex-wide Advanced Design and Production Technologies (ADaPT) initiative, are designed to provide cost-effective technologies for use in ongoing refurbishment activities at the earliest possible date.

We have ongoing activities to extend the life of the W87. The objective is to enhance the structural integrity of the W87 so that it may remain part of the enduring stockpile beyond the year 2025 and will meet anticipated future requirements for the system. The W87 warhead/Mk21 reentry vehicle (RV) is the leading candidate for a single RV option for the Minuteman III ICBM. It is the most modern and safe US nuclear warhead. It incorporates all "Drell safety" features: Insensitive High Explosive, a Fire Resistant Pit, and an Enhanced Nuclear Detonation Safety.

The W87 Life Extension Program (LEP) exercises many aspects of the nuclear weapons complex and provides a model of how stockpile stewardship and management must work. Livermore has worked closely with the Air Force, the DOE production agencies and plants, and the other weapons laboratories to ensure that the warhead alterations can be carried through at the plants and will meet the requirements of the customer.

Interactions with the DOD include a detailed examination of the current operating environment of the W87/Mk21, as well as a projection into the future of how that environment may change. W87 LEP activities include flight testing, ground testing, and physics and engineering analysis. We work with Air Force Space Command and defense contractors to interpret and apply the data obtained. These activities are being coordinated by a Joint DOD/DOE Working Group under the direction of the Nuclear Weapons Council.

W87 LEP warhead refurbishment activities involve the Pantex Plant, Allied Signal in Kansas City, and the Y12 Plant in Oak Ridge. We involved the plants early in the LEP so that an option is developed that meets performance requirements and can be produced efficiently with high quality. Operations at the Y12 Plant have provided the greatest challenge for the W87 LEP because of the suspension of many operations at that facility. As a work-around, Livermore has been building the mock W87 hardware required for the development phase of the LEP.

In consultation with Y12 engineers and facility managers, we are developing refurbishment processes and equipment to be used for full scale production. Our emphasis is on the use of modular workstations and new technologies to reduce waste, floor space, and necessary equipment. An example is the use of laser technology developed at LLNL to cut certain high-value parts. The importance of this technology is that the amount of material removed in the laser-cutting process is extremely small, with almost no damage to the remaining material. The process not only preserves the existing part, but it essentially eliminates the waste stream created in the traditional remanufacturing process.

A demonstration project is underway to show the feasibility of using lasers to cut high-value parts in the W87. The project utilizes capabilities developed in the Inertial Confinement Fusion program and in the Atomic Vapor Laser Isotope Separation program along with technologies that have been developed over the last several years in Cooperative Research and Development Agreements with various industrial partners. The demonstration will be conducted in an environmentally controlled workstation designed and built at Livermore in a cooperative effort with Y12 personnel. If the demonstration is successful, the technology can be transferred to the production environment. While this technology will be specifically developed for the W87 LEP, it has general applicability to several stockpile systems and could be applied to future refurbishment programs.

Finally, we must determine whether the alterations could have any appreciable effect on nuclear yield and certify the performance of the refurbished weapon. We are using archival information, data gathered in new experiments (including some using the Nova laser), and a combination of established computer simulation techniques and new ones. Los Alamos has been an active observer at all phases of the W87 LEP, and formal peer review has taken place in the conceptual phase and the final development phase of the program. As we move into final testing and evaluation, further in-depth review will be requested before LLNL certifies the final refurbishment option.

Special LLNL responsibilities in Stockpile Stewardship and Management

Stockpile Responsibilities. Livermore shoulders special responsibilities in the Stockpile Stewardship and Management Program because we are the design laboratory for weapon systems in the enduring stockpile and for weapons to be retired. For the latter, we have a continuing active responsibility to ensure safe and timely dismantlement and disposition of excess materials. Dismantlement of the W68 SLBM warheads and the W71 ABM warheads has been completed, and work is essentially completed on the W70 Lance warheads. Weapon systems that are currently being dismantled or are to begin to be dismantled soon include the W48 and W79 artillery projectiles, the W55 SUBROC, and the W56 ICBM warheads.

Livermore's responsibilities for the enduring stockpile include the 883 bomb, the WB4 cruise missile warhead, and the W87 ICBM warhead. These are the only systems in the inventory with all the modern safety features, and they are expected to endure past their originally anticipated lifetimes. In addition, Livermore is responsible for the W62 ICBM warhead, which is to remain in the active inventory past the end of the decade. We are developing comprehensive plans to extend the life of these systems, and significant effort currently is being expended on their surveillance, maintenance, and selective refurbishment. Our efforts in the W87 Life Extension Program have previously been described.

Special User Facilities at LLNL. Livermore has additional responsibilities in the Program because of our special skills and capabilities and the unique user facilities that exist at Livermore. In addition to a number of important but smaller science and engineering facilities, these include:

- *the High Explosives Applications Facility (HEAT),* which is the most modern facility for high explosives research in the world;
- *the Nova laser facility,* which—until construction of the National Ignition Facility—remains the premiere facility in the world for conducting high energy density physics experiments essential to evaluation of important nuclear weapons issues;
- the Flash X-Ray facility at Site 300, which is currently the most capable hydrodynamic test facility in the world;
- the Secure and Open Computing Facilities at LLNL, which meet our core program needs for stockpile stewardship and serve as a testbed for development of high-performance computing hardware and software;
- the AVLIS facility and program, with the most advanced capabilities in the world for conducting research and development on industrial-scale processes involving uranium; and
- *the Superblock,* small, but modern facilities for special nuclear materials research and engineering testing.

Livermore also has the lead in the development of two major user facilities that figure prominently in the Program: the National Ignition Facility and the Contained Firing Facility at Livermore's Site 300.

The National Ignition Facility. The National Ignition Facility (NIF) was identified by the Assistant Secretary of Energy for Defense Programs, Victor Reis, as being "the most important new facility" in the Defense Programs budget request last year. The NIF is a cornerstone of the Stockpile Stewardship and Management Program. It is the only facility that will permit well-diagnosed experiments pertinent to fusion and high-energy-density is also the critical next step in the development of Inertial Confinement Fusion (ICF) as an environmentally attractive energy source, and it will serve as a user facility for a wide range of fundamental scientific research. Initial operational capability is planned for late 2002. To keep to this effort on schedule and on budget, DOE Defense Programs has requested $191 million for the NIF project in fiscal year 1997.

This fiscal year 1997 budget request has two components: a $132 million line item for NIF construction and $59 million as a portion of the roughly $240 million fiscal year 1997 national ICF base program. I urge full funding for both the NIF and the national ICF base program. These highly interrelated efforts have recently been favorably reviewed by the Inertial Confinement Fusion Advisory Committee and the JASONs. The JASON report concluded: "we are convinced that the present ICF program *does* make an important contribution to science-based stockpile stewardship, and that the NIF will *substantially* increase this contribution."

The NIF will consist of the laser system and optical components, a target chamber, and computer control system all in an environmentally controlled building. The laser, consisting of 192 beams to deliver 1.8 million joules and "ignite" small fusion targets, will be the world's largest optical instrument. Its construction will allow America to retain world leadership in ICF. It will advance U.S. high technology industries such as those in optics, lasers, materials, high-speed instrumentation, semiconductors, and precision manufacturing. The DOE has estimated that at the peak of activities the project will create about 3,000 construction and manufacturing jobs nationwide.

Following completion of the Conceptual Design Report in April 1994, Secretary O'Leary announced her approval of Key Decision 1 for the NIF in October 1994, which allowed the next phase of NIF design to begin. At that time, the Secretary established a formal process to evaluate the consistency of the facility with U.S. arms control and nonproliferation objectives. The completed study, which went through interagency review, concluded that the "technical proliferation concerns of the NIF are manageable and therefore can be made acceptable" and that "the NIF can contribute positively to U.S. arms control and nonproliferation policy goals."

Substantial progress has been made on the NIF project this past year. We have completed an updated Quality Assurance Plan, the Project Execution Plan, the Title I Plan, and Advanced Conceptual Design. Selection has been made of the NIF project architect and engineering contractor. In addition, together with Los Alamos, Sandia, and University of Rochester's Laboratory for Laser Energetics, we began the next phase of design work (Title I) for the NIF.

We also continued our experiments using the Beamlet laser, which is a full-scale prototype of a NIF beam. This work is providing us high confidence in NIF performance, schedule, and cost goals. We have demonstrated NIF laser performance on a per-unit-area basis, and we are now testing the target illumination capability of the system.

The NIF will attract talented scientists and engineers to contribute to stockpile stewardship because multiple benefits will derive from a vigorous ICF program in the coming decades. As a user facility, the NIF will support research on:

- *National Security.* The NIF will provide access to high-energy density physics regimes essential to evaluation of important nuclear weapons issues. Scientists will be able to obtain nuclear-weapon-related physics data, particularly in the area of fusion and the high-energy-density physics which occurs after the high explosive is detonated for comparison with advanced numerical simulations. These include high-quality opacity data for partially ionized materials, valuable information about the mixing of layers of different materials during implosion, and data that can help us assess the impact of cracks and other abnormalities on weapon performance. Other experiments will be able to provide valuable data on nuclear weapons effects issues. Moreover, the NIF will help us evaluate issues for existing designs and improve and test computational models, but it will not enable us to design new weapons *per se.*
- *Fusion Energy.* The NIF is an essential element in the program for the development of inertial fusion energy for civilian power production. If net fusion energy gain is demonstrated, as anticipated, the NIF will constitute a crucial step towards the ultimate goal of providing energy security for the U.S. in the 21st Century. The role of the NIF and ICF as the principle alternate to the Tokamak was acknowledged by the recent Fusion Energy Advisory Committee report.
- *Science and Technology.* The NIF will produce conditions in matter similar to those found at the center of the sun and other stars. New, well-characterized, high-energy-density regimes will be routinely accessible in the laboratory for the first time. The NIF will advance scientific and technical fields such as astrophysical sciences, plasma physics, atomic and radiative physics, hydrodynamics, materials science, advanced coherent and incoherent X-ray sources, nonlinear optics, and computational physics. Scientific progress in those fields will, in turn, provide enhanced understanding of the physical conditions in nuclear weapons.

The need for the NIF is independent of any siting decisions. However, Secretary O'Leary has voiced her preference for Livermore. LLNL is the natural siting choice because of the large contribution we have made to the advancement of ICF, our development of the new laser system to be part of the NIF, and the fact that LLNL has over 4000 staff-years of experience in ICF and related science and technology. The facility would greatly benefit from and contribute to LLNL's existing unique capabilities in lasers, and the NIF would play a key role in the future evolution of Livermore.

The Contained Firing Facility at Site 300. Hydrodynamic testing is the only currently available way of experimentally testing the high-explosives-initiated implosion phase of a nuclear detonation. These are critical experiments for understanding weapon safety, assessing the performance of weapon primaries, and evaluating the feasibility of approaches for safely disabling a nuclear device. The Stockpile Stewardship and Management Program includes funding for construction of the Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT) at LANL and for upgrade of the Flash X-Ray facility (FXR) at LLNL's Site 300 to make it a Contained Firing Facility. Containment of the FXR test bed and the debris from explosive experiments will enhance this important national capability and permit its continued use even if there are future, more stringent environmental restrictions. Investment in the Contained Firing Facility ensures our ability to continue critically important hydrodynamic experimentation into the 21st Century.

The FXR is the best diagnostic tool currently available for measuring integrated performance of nuclear weapon primaries by nonnuclear testing. We continue to improve its capability. Last year a major upgrade was completed to increase the power of the electron beam produced by the linear accelerator at the facility. During a hydrodynamic experiment a tantalum target converts the electron beam into an intense X-ray beam, which is used to take an X-ray picture of the test object. The upgrade permits us to obtain a higher resolution X-ray photograph of an imploding mock primary and to take the picture even later during in the implosion process when the material is extremely dense. Our next planned upgrade, which has just begun and is due to be completed in about 2 years, allows scientists to take two pictures during an experiment and directly determine the velocity of the imploding materials.

STEMMING THE PROLIFERATION OF NUCLEAR WEAPONS AND OTHER WEAPONS OF MASS DESTRUCTION

Proliferation dangers and responsive activities at LLNL

Stemming proliferation of weapons of mass destruction (WMD) is a critical priority for the United States. It is a major challenge that requires a multifaceted effort by the U.S. Government with activities and programs coordinated among the various agencies that shoulder nonproliferation responsibilities. The DOE laboratories are working closely together to support DOE's nonproliferation objectives, which are to control nuclear materials and expertise, reduce nuclear weapons worldwide, roll back proliferant development programs, prevent acquisition of nuclear weapons, avoid surprise, and respond to proliferation emergencies.

Nation-states or rogue subnational units, such as terrorists, might acquire nuclear capability through the theft and subsequent sale of fissile materials or weapons. Alternatively, proliferation can occur through indigenous development programs that draw on the increasing availability of nuclear technology and the continuing spread of nuclear expertise. Livermore's arms control and nonproliferation activities respond to both of these troubling proliferation scenarios. Our efforts are concentrated in three areas:

- *Controlling nuclear material at its source and stemming the spread of nuclear know-how.* Since the break up of the Soviet Union, this has been a major thrust area for the DOE national laboratories. Our principal activities relate to control of fissile material throughout the Newly Independent States (NIS), support of Russian efforts in weapons dismantlement and materials disposition, and cooperative threat reduction in the NIS through defense conversion activities at their nuclear laboratories.
- *Countering nuclear smuggling and nuclear explosive terrorism.* In spite of best efforts at control, some nuclear material might get into the wrong hands. Events this past year in Oklahoma City, Tokyo, London, and Tel Aviv soberly warn us of the danger posed by the possibility of nuclear terrorism. The threat of WMD terrorism has become a high priority national concern. Livermore is taking the lead in aspects of countering nuclear smuggling and nuclear terrorism through new initiatives which I will describe. These efforts should be strengthened, and they could be widened to counter chemical and biological threats through application of many similar detection and analysis techniques.
- *Detecting and reversing nuclear weapons activities by nation-states.* These activities include long-standing Livermore programs in intelligence analysis, in sensor development for detecting and monitoring WMD activities, and in support of treaty negotiation and implementation.

The progress the DOE laboratories has made in these three areas is substantial, and some of Livermore's specific accomplishments are discussed below. We have made a good start at dealing with post-Cold War nuclear threats to U.S. interests. However, the technical and policy challenges posed by these threats are considerable and much more needs to be done. For many of our activities, progress is constrained by funding and important milestones could be achieved earlier if additional resources were available.

Controlling nuclear materials and stemming the spread of nuclear know-how

Since the breakup of the Soviet Union, controlling nuclear materials and expertise has been a major thrust area for the DOE national laboratories. Our principal activities are:

Control of Fissile Material throughout the NIS. Livermore contributes to the Los Alamos-led multi-laboratory DOE program to improve nuclear material protection, control, and accountability (MPC&A) at Russian facilities. As part of this effort, LLNL has the lead in assessing the vulnerability of storage facilities and providing measurement systems for fissile material to Russian institutes so that they can establish and verify nuclear material inventories.

In addition, our interactions in other Newly Independent States helped identify the existence of hundreds of kilograms of highly enriched uranium in Kazakhstan, which were subsequently withdrawn to the U.S. in the highly successful Project Sapphire led by Oak Ridge National Laboratory in 1994. Afterwards, we led a multi-laboratory team that developed a program to provide technical assistance to Kazakhstan.

Russian Warhead Dismantlement and Materials Disposition. LLNL has a lead technical role in the negotiations for Mutual Reciprocal Inspections of fissile material removed from dismantled nuclear weapons. This is an initiative with Russia to gain confidence in the process of nuclear warhead dismantlement. We participate in the DOE Transparency Working Group, which develops white papers for the Interagency suggesting U.S. positions on various possible monitoring arrangements. LLNL is now chairing an effort to evaluate warhead radiation signatures for tracking warheads through the dismantlement process. We have had exchange meetings on these issues with the Russians, which have included technical demonstrations at Livermore's plutonium facility.

In addition, LLNL continues its lead-laboratory role in the development and implementation of transparency measures associated with the purchase of highly-enriched uranium from Russia. We have provided technical guidance on monitoring visits and familiarization visits to technical facilities in Russia and at the two transparency review committee meetings.

Finally, the DOE is evaluating alternative means for disposition of excess fissile materials. Livermore is responsible for assessment of two of the options (geological disposition in a deep borehole and immobilization in either glass or ceramics) and for technical work on the immobilization option. The U.S. has recently engaged the Russians in parallel studies. This issue is expected to be addressed at the summit meeting on nuclear safety to be held in Moscow in the spring of 1996. Recently, we hosted a meeting of the U.S. and Russian delegations in which proposals were developed for joint experimentation to advance disposition technology in both countries.

Commercial development activities at NIS weapons institutes. Livermore is heavily involved in international nonproliferation efforts aimed at engaging those with nuclear know-how in the NIS in commercially viable work with non-weapons and civilian applications. LLNL is a principal participant in the Industrial Partnering Program, which pursues defense conversion of former nuclear weapons institutes in the NIS through partnerships with DOE laboratories and American industry in projects that have commercial potential. Livermore is involved in over 20 projects—many initiated last year—that employ over 400 NIS weapons scientists.

Countering nuclear smuggling and nuclear-explosive terrorism

To protect against failure to control nuclear material at its source, we are pursuing new initiatives to counter nuclear smuggling and nuclear-explosive terrorism.

Countering Nuclear Smuggling

As part of a priority U.S. effort to combat the threat of nuclear smuggling, DOE was made the lead agency for technical analysis of nuclear trafficking incidents and for MPC&A cooperation (described earlier). LLNL is leading two important efforts to counter nuclear smuggling:

- *Support to law enforcement and other agencies in assessing illicit nuclear trafficking cases and in training U.S. and foreign officials.* DOE's assessment capability for illicit nuclear trafficking, centered at Livermore, is a unique national and international resource in dealing with actual or alleged cases of nuclear smuggling. Closely affiliated with our long-standing nuclear threat credibility assessment capability, this program draws on all-source databases (including details on incidents dating back to 1966) and experienced analysts to provide on-call support to law enforcement and other officials in the U.S. and abroad. In 1995, we provided technical assessments to law enforcement agencies in many separate cases involving the attempted illegal sale of alleged nuclear materials; and, related to counter-nuclear terrorism, we direct and participate in the credibility assessment of nuclear extortion threats targeting the U.S.

We also train foreign police and customs officials to be more effective in detecting and investigating nuclear trafficking. We provided instruction at the International Law Enforcement Academy in Budapest, at other international customs seminars and conferences, and in various bilateral settings. We have also designed and tested a nuclear material identification kit that can be used by inspectors at checkpoints or suspected sites for detecting nuclear smuggling. Early versions are now available to U.S. Government agencies.

- *Forensic analysis of seized materials to gain information about their origin and route.* A few extremely significant nuclear smuggling cases have involved the seizure of kilogram quantities of genuine, weapons-usable nuclear materials. In such cases, it is vitally important to learn as much as we can about the stolen materials and their origin, so that officials can shore up security deficiencies, determine whether additional material is at large, and prosecute the criminals involved. Detailed forensic analysis of confiscated materials and associated packaging can play an important role, and in 1995 LLNL led a multilaboratory DOE effort to select and apply relevant techniques to this problem. Because most seizures have occurred abroad, international cooperation is indispensable.

In November 1995, LLNL hosted the highly successful International Conference on Nuclear Smuggling Forensic Analysis, which brought together a mix of technical, intelligence, and law enforcement experts from 14 countries to compare experiences and techniques. Notable was the participation by the Russian Federation, which can play a pivotal role in helping to determine sources of smuggled nuclear material. The Conference paved the way for ongoing technical cooperation through the creation of an International Technical Working Group (ITWG) and an agreement to conduct international exercises. At the first meeting of the ITWG earlier this year, plans were developed for an international interlaboratory exercise, which will include the analysis of the highly enriched uranium seized in an actual nuclear smuggling case in 1994. A follow-on meeting of the ITWG is planned for this summer in Moscow.

A more comprehensive effort in counter-nuclear smuggling will require a strategically-planned multilaboratory/multiagency program. Within DOE, a Focus Group is working to coordinate DOE's anti-smuggling activities and to identify gaps where new or expanded work is needed. Proposals are being developed for additional investments in this important area.

Countering Nuclear Explosive Terrorism. Countering the covert delivery of nuclear devices against the U.S. is closely related to countering the smuggling of nuclear materials since many similar detection and analysis methods can be used. Our approach is to build on our extensive experience with DOE's Nuclear Emergency Search Team (NEST), the Threat Credibility Assessment Center, the Accident Response Group, the Radiological Assistance Program, and the Federal Radiological Management Assessment Center. Our new efforts include evaluating the risk, developing improved techniques for detection and disablement, and devising new investment strategies for dealing with nuclear terrorism:

- *Evaluating the risk of stockpile theft.* Using new research in human reliability and new security simulation codes, we recently completed an assessment of the risks associated with the theft of a nuclear weapon from the U.S. stockpile by a terrorist group and the subsequent use of that weapon against this country. Our findings will improve our understanding of security needs for nuclear weapons storage worldwide.
- *Developing a new concept for fissile-material detection—Wide Area Tracking System (WATS).* WATS is a concept for detecting covertly-delivered nuclear devices with a system that can be deployed rapidly to detect the movement of nuclear materials. The WATS project is expected to transition into a formal DOD/DOE Advanced Concept Technology Demonstration (ACTD) in fiscal year 1997. During the first year of the 2-year ACTD effort, we will work with the military to determine operational requirements and complete the hardware design/integration.
- *Developing new techniques for the disablement of improvised nuclear devices (INDs).* We are striving to develop high-confidence techniques that can be used to disable, without producing any nuclear yield, a large spectrum of possible INDs which might be encountered in a nuclear terrorist incident. Results to date have been very positive. However, at the current level of funding, development and proof testing of our next field deployable technique is several years away. Funding limitations have also necessitated placing on hold the pursuit of other promising advanced disablement concepts.
- *Initiating a comprehensive study.* We are initiating a comprehensive study to better understand U.S. needs and appropriate technological and systems solutions to counter nuclear (and other WMD) terrorist threats. Our goal is to determine how the national laboratories and other agencies can best leverage their resources, so that the most important and most tractable problems receive the greatest effort.

Detecting and reversing nuclear weapons activities by nation-states

Our more traditional activities in monitoring and rolling back nuclear weapons programs of proliferants include long-standing Livermore programs in intelligence analysis, sensor development, and support of treaty negotiation and implementation. We also provide support to counterproliferation efforts, which are funded by DOD.

Intelligence Analysis and Policy Support. Livermore has been supporting the U.S. intelligence community for 30 years by tracking and analyzing the nuclear developments in countries of importance to U.S. nonproliferation goals. Our technical support assists U.S. policy makers in taking actions to encourage the exclusively peaceful use of nuclear technology and to discourage the proliferation of nuclear weapons. In addition, we have completed numerous studies of the paths to nuclear weapons production being taken by several proliferant countries. These analyses are used by many Government agencies that deal with proliferation issues as they evaluate possible response options and develop policy strategies to reduce regional tensions and motivations for WMD proliferation.

We also have supported the U.S. Government in negotiations with countries such as India, Kazakhstan, North Korea, Russia, South Africa, and Ukraine. In addition, we evaluate for DOE an average of five to ten export requests a week concerning prospective illegal or inappropriate exports of information or commodities. We make certain that U.S. exports are in compliance with Federal law and international nonproliferation commitments.

Sensor Development for Detecting and Monitoring WMD Activities. Nonproliferation sensor research and development constitutes our largest program effort for DOE's Office of Nonproliferation and National Security. This work, coordinated with that of other DOE labs and Government agencies, focuses on the development of unique instrumentation and techniques for use by the U.S. military, intelligence, and arms control communities. LLNL-developed sensors are used in international operations for treaty-compliance monitoring and mutual confidence building. In addition, Livermore has provided specialized monitoring equipment to the United Nations for the long-term monitoring program in Iraq.

The challenge in developing sensors to detect proliferation activities is to create instruments which are both highly sensitive and highly selective for detecting weak signal in difficult environments. Our accomplishments span a range of sensor technologies, from remote sensors to portable hand-ons and unattended instruments, for various applications:

- *Sensors for remote optical characterization of proliferation activities.* Many industrial processes generate and release tell-tale chemical signatures which can provide information about the activities taking place within a facility. The ability to remotely interrogate the chemicals released into the environment from a facility would provide a powerful means for monitoring treaty compliance or detecting weapons production activities. Our efforts include fielding systems that—over time—incorporate progressively more advanced technology to accomplish this challenging objective.

Livermore is also involved in the development of imaging sensors to provide both spatial and spectral information about suspect facilities. Airborne tests of the Compact Airborne Multispectral Imager held during 1995 and early 1996 demonstrated the use of this DOE/ LLNL-developed technology for aerial reconnaissance. LLNL has led the development of a new, more sensitive infrared spectrometer for airborne remote sensing of trace chemicals in the atmosphere. It will be flown aboard a U.S. Navy aircraft in 1996 as part of the DOE Airborne Multisensor Pod System.

We are a major participant in an advanced-technology multi-laboratory program to develop laser-based systems for detecting trace chemicals in the atmosphere, particularly those that might indicate activities associated with nuclear weapons production. LLNL is responsible for the development and engineering of systems that utilize state-of-the-art solid state laser hardware and for characterizing chemical signatures. We operate the facility used for hardware testing at the Nevada Test Site.

- *Laboratory and field-portable instrumentation for chemical analysis.* Livermore scientists have developed a prototype advanced, portable mass spectrometer that is light-weight, battery-operated, and capable of detecting chemicals in the environment at very low levels. It is for use in the field by arms control inspectors during cooperative, on-site visits and would provide real-time feedback at the facility to help identify locations for further sampling, analysis, and investigation. In recognition of the significant technological advances that went into this design, Livermore scientists were presented an R&D 100 award in 1995 by *R&D* Magazine.

Livermore is also home to a state-of-the-art analytical laboratory, the Forensic Science Center, whose specialized staff bring a wide range of advanced chemical analysis techniques to bear on special samples for the U.S. Government and law enforcement communities. The Forensic Science Center is a unique resource for analytical instrumentation and methods tailored to the needs of the proliferation detection community.

- *Unattended ground sensors.* Our unattended ground sensors program draws on microtechnologies to achieve small size and low power consumption. We have developed and deployed networked sensor systems for treaty monitoring. These sensor technologies have also been used for environmental characterization, counter-narcotics, civilian law enforcement, and immigration and border control.

Treaty and Arms Control Support. Our treaty and arms control work principally focuses on support to the International Atomic Energy Agency (IAEA) and issues about monitoring a Comprehensive Test Ban Treaty (CTBT). We are also supporting activities related to the START treaties, a Fissile Material Cutoff Treaty, the Chemical Weapons Convention, and regional security issues.

- *Support to the IAEA.* LLNL has been helping the IAEA meet its new technical challenges following the post-Gulf War revelation of Iraq's extensive nuclear weapons program. We have supplied inspectors and developed and fielded equipment in support of inspections in Iraq; we have worked with IAEA to bolster the Agency's ability to enforce safeguards; and we are providing technical assistance to selected foreign laboratories on peaceful uses of nuclear technologies.
- *CTBT Monitoring.* The CTBT effort at LLNL is focused on completing the research and development necessary to permit effective monitoring of the Treaty. Livermore is working closely with the other national laboratories to deliver software systems this year that can accurately locate and identify events with explosion characteristics in regions of interest. We also have provided input to DOE on the impact of a CTBT on the maintenance of the U.S. nuclear stockpile. These studies have allowed DOE to develop negotiating positions for Interagency consideration prior to and during the CTBT negotiation. In addition, our scientists have provided expertise to the Conference on Disarmament, the international Group of Scientific Experts on seismic detection, and the On-Site-Inspection Working Group.

INSTITUTIONAL AND MANAGEMENT ISSUES

Improving the way LLNL does business

On September 25, 1995, as the President directed DOE to carry out the necessary programmatic activities to ensure stockpile performance, he also stated that:

> "* * * these labs must be run as efficiently as possible. I have directed the agencies to review and, as appropriate, to rescind internal management instructions and oversight that impede laboratory performance. I have directed the agencies to clarify and focus the mission assignments of their laboratories. I also have directed the agencies to achieve all possible budget savings through streamlining and management improvements before productive R&D programs are sacrificed."

It is important that we succeed in these efforts. Livermore has been working with the DOE on management and oversight issues through Department-wide efforts and various pilot projects aimed at streamlining excessive DOE rules and regulations and consolidating laboratory audits and reviews. In addition, we have stepped up our long-continuing efforts to improve the efficiency and effectiveness of LLNL operations and cut costs.

At Livermore we have made major progress on a broad range of initiatives to achieve cost reductions and greater efficiency in meeting our mission objectives. Some highlights include:

- *We have managed to downsize the workforce at the Laboratory by over 2000 people or approximately 20 percent over the past half dozen years without significantly disrupting operations.*
- *We have restructured major parts of our organization to clarify and strengthen lines of responsibility and accountability.*
- *We are just completing a top-to-bottom cost cutting review which is providing an objective basis for further workforce restructuring and economization.*
- *We are reducing overhead and out-sourcing more of the routine services required to support our activities.*
- *We have greatly streamlined our procurement practices and reduced the size of our business operations organization by 38 percent as well as reduced the cost by 30 percent since fiscal year 1994.*

These actions and others currently being planned will improve our cost effectiveness without sacrificing our ability to meet programmatic milestones.

University of California management of the work performed by LLNL

A second important aspect of Livermore's administration and operations is the role of the University of California (UC) in overseeing our work (and that performed by the Los Alamos and Berkeley laboratories). The current management and operating contract between UC and DOE added a much stronger management role for the University, and it also introduced performance measures as a way of evaluating the activities of the laboratories. On balance the new contract has been quite successful. It pioneered the whole concept of performance-based management within DOE, and in many ways this contract has paved the way for other recent contractual actions taken by DOE.

An exceedingly important part of this management role is the University of California's President's Council on the National Laboratories, which oversees all the scientific and technical work performed at the three National Laboratories UC manages. In particular, the National Security Panel of the President's Council is providing outstanding service to the nation. The Panel has a very strong influence on the national security activities at the laboratories through its effective reviews of our programs. Its constructive criticism of our scientific work, its probing questions, and its recommendations how the laboratories can better integrate their efforts have had a major impact on the design of the Stockpile Stewardship and Management Program.

The University of California has been the contractor operating Livermore—as well as Los Alamos and Berkeley—since our beginning. This arrangement has provided great benefit to LLNL and the nation. It has been a major factor in attracting and maintaining the quality of our workforce, it has provided an atmosphere in which independent views and technical honesty are treated as core values, and it has led to an array of scientific and technical associations that would have otherwise not been achievable. These are exceedingly important factors to preserve as we face new technical challenges in stockpile stewardship and management and in stemming proliferation.

SUMMARY REMARKS

The DOE Stockpile Stewardship and Management Program lays out a challenging program for the national security laboratories and other elements of the nuclear weapons complex. It represents a major change from the design and testing of weapons to a program in which enhanced surveillance of the stockpile, nonnuclear experiments, and computations form the basis of judgments about the safety and reliability of weapons. It calls for the creation of a manufacturing capability that depends on strong partnerships among the laboratories, modernized production facilities, and American industry.

The Stockpile Stewardship and Management Program is a demanding effort which requires a long-term commitment by outstanding scientists and engineers. It also requires long-term, new investments in capabilities and facilities for stewardship and management of the enduring stockpile—on the order of $4 billion per year for a decade. This can only happen if there is sustained bipartisan support for the Program from Congress and the administration. Accordingly, I urge your strong support of the fiscal year 1997 budget submission for Defense Programs. It is imperative that we lay a solid foundation early in the effort to ensure the Program's success.

Technically difficult challenges also face Livermore scientists and engineers working on projects to stem the danger of proliferation of weapons of mass destruction. Livermore plays a very prominent role in the national effort, providing expertise and technology to support arms control policy development, arms control verification, and intelligence analysis of nuclear weapons activities worldwide. We are also undertaking leadership roles to counter nuclear smuggling and nuclear terrorism, and we are heavily involved in activities to help Russia improve protection, control, and accountability of its fissile materials. Much more can and needs to be done. Consequently, I also urge your strong support of the program proposed by the Office of Nonproliferation and National Security. We should also explore mechanisms for broadened Federal support from other agencies in this important area.

Senator KEMPTHORNE. Dr. Tarter, thank you very much. Dr. Hecker, welcome.

STATEMENT OF DR. SIEGFRIED S. HECKER, DIRECTOR, LOS ALAMOS NATIONAL LABORATORY

Dr. HECKER. Thank you, Mr. Chairman, Senator Bingaman. It is good to be back here.

You have obviously gotten the message that money is pretty important and you have already quoted from my testimony that I thought, at least as translated to Los Alamos, the resources were not adequate. But let me focus on something other than the money because you asked a very important question, and that is what is our most pressing problem and concern.

I would like to focus on changing the paradigm. You have already heard that terminology. Of course, for a first approximation, the thing that is most important to us is this change to a no test paradigm. You have heard much about the science-based approach that is going back to a more fundamental understanding of the science and the engineering of everything that goes into nuclear weapons. But because of the focus here today, which is more in the direction of the plants and manufacturing, let me focus instead on two other things, that is, the issue of enhanced surveillance and remanufacturing. I would particularly underscore the aspect of the people.

In nuclear weapons, we talked about the safety and the reliability, and the reliability and the safety is not so much in the product, it is in the people. This is because these things take the tender, loving care and the constant baby sitting all throughout their lifetime and through their disposal.

I would say, similarly, that the surveillance and the manufacturing is not so much let's say in the blueprint as it is in the people. This is because things will be very different in the future.

Essentially, the best example I can give you of what does enhanced surveillance mean is perhaps to compare it to the medical profession. What we have done in the past is essentially gone and opened these things up to see what went wrong at the plants. Then, if something was wrong, we would replace them.

That is like a doctor in the old days with a stethoscope, just to make sure that your heart was still beating. What we want to do in the future, as Dr. Reis pointed out earlier, is to be able to predict. For that, we want to do the equivalent of an MRI, a magnetic resonance imaging, or a PET scan in a positron emission tomography, or a MEG, magnetoencephalography, to really try to understand what is working and what is not working so that we can fix it or avoid those problems in the future.

And so, for enhanced surveillance, we want to be able to use neutrons; we want to be able to use the best radiography possible, perhaps not only X-rays but neutrons as well as protons.

So these techniques are the ones that will have to be developed at the laboratories. But it has to be done in conjunction and partnership with the plants.

Similarly, in remanufacturing, I would venture to state that we will never make another weapon the way that we made the last one. One of those reasons alone is the fact that you only see four production plants here.

The last time we looked around, there were seven, and at one point I think there were 11 integrated contractors for the Department of Energy defense programs. So contractors, such as Rocky Flats, are no longer there.

So, for instance, if we just take plutonium alone, we will no longer make it the same because we will not roll and form a plutonium component. We will cast it.

We may machine it differently because perhaps what we used for machining lubricants is no longer allowed environmentally, or it makes too much waste, so it makes it too expensive.

Well, if we use a different lubricant, what does that do to the surface, and if we keep the plutonium around for much longer than we used to in the past, we're worried about the surface, or, in fact, we are worried about how the plutonium changes over time, or the high explosives, and so forth.

So the remanufacturing process will also be an interchange of the laboratory and plants. So the paradigm is not just the science based stockpile stewardship, but the paradigm change is one of an integrated R&D enhanced surveillance and remanufacturing paradigm. I think that is one of the reasons that you see us here together today. We must make that change to the paradigm, and I think that is one of the major challenges that we face.

[The prepared statement of Dr. Hecker follows:]

Prepared Statement by Siegfried S. Hecker

Mr. Chairman, thank you for the opportunity to testify before this committee. Los Alamos takes very seriously its national security mission in *reducing the global nuclear danger* and we stand ready to work with this committee to ensure United States leadership by our efforts in the stewardship and management of the nation's nuclear weapons stockpile, in nonproliferation and nuclear materials disposition, and in dealing with the nuclear legacy of the last 50 years.

The last year has been a significant one for nuclear weapons issues. In February, The Galvin Task Force on Alternative Futures for the Department of Energy (DOE) Laboratories issued its report endorsing science-based stockpile stewardship and calling for dramatic increases in productivity at the laboratories. Last summer saw the extension of the Nuclear Nonproliferation Treaty, followed closely by the resident's declaration to seek a Comprehensive Test Ban Treaty (CTBT) with zero yield testing. Science-based stockpile stewardship was again put forward as the vehicle to ensure confidence in the nation's nuclear deterrent in the absence of nuclear testing. In September, the National Science and Technology Council completed its review of the major Federal laboratories, concluding that

> ". . . the continued vitality of all three Department of Energy (DOE) nuclear weapons laboratories is essential to the nation's ability to fulfill the requirements of stockpile stewardship as we enter in a Comprehensive Test Ban regime."

Finally, in January of this year the START II treaty was ratified and, if approved by the Russian Duma, will result in significant reductions in nuclear forces and will eliminate the most destabilizing counterforce weapons.

As the Director of the Los Alamos National Laboratory, I must personally certify each year that Los Alamos weapons in the stockpile are safe, secure, and reliable. I must do this for an aging stockpile in the absence of nuclear testing and in the absence of new-design production. This is a significant responsibility, and I must rely on the Congress and the Department to help provide the resources that I need to keep my Laboratory vigorous and vital so we can accomplish this task.

There are four points that I would like to make today.

- Under a CTBT regime with no nuclear testing, confidence in the nation's stockpile will require that we attract and retain first class scientists and engineers, build new facilities and upgrade existing ones, and develop new understanding. Science-based stockpile stewardship and management are incredibly difficult tasks. *To some extent we face greater challenges than any we have faced before*, challenges that we are already beginning to meet.
- We have an important role in other aspects of reducing the global nuclear danger, those involving the proliferation of weapons of mass destruction, the disposition of nuclear materials, and the cleanup of 50 years of nuclear weapons production. Again, we are already making a difference in these areas.
- Success in these tasks requires that we remain a *scientific* laboratory of the first rank, forming partnerships with universities so that we are allied

with the best science in the world and with industry so that we are allied with the best manufacturing technology in the world;

- We have confidence that science-based stockpile stewardship and management can meet the nation's needs in nuclear weapons technology. The plan must be supported by the Department and the Congress now and over the long term. At the same time, we must demonstrate that we are as effective and efficient as we can be.

I have included an appendix on the Laboratory's role in science-based stockpile stewardship. It presents in greater detail what is involved in terms of the Laboratory's activities and facilities. Let me now deal with each of these major points.

THE IMMEDIATE CHALLENGE OF SCIENCE-BASED STOCKPILE STEWARDSHIP AND MANAGEMENT

Since the beginning of the Cold War era, the nuclear weapons stockpile has been maintained through a strategy of surveillance, nuclear and nonnuclear testing, and an active program of new warhead design and replacement. Post-Cold War U.S. objectives of enhancing nonproliferation goals and seeking a Comprehensive Test Ban Treaty, while providing for the continued assurance of a smaller stockpile, have required that a new paradigm for stockpile stewardship be developed, without the conduct of underground nuclear testing and without new warhead design. We must also ensure that we can meet the needs of our military customers for a resilient and flexible stockpile management and remanufacturing complex.

A New Paradigm for Stockpile Stewardship and Management

Our approach to stewardship in this new era will rely on three interconnected thrust areas at Los Alamos:

(1) Surveillance to allow us to examine and diagnose aging phenomena in stockpile weapons;

(2) Assessment of the physical observations using detailed calculations and experiments to evaluate the safety and performance of each weapon; and

(3) Development of appropriate responses based on those expert assessments, responses that may include modifications to, or remanufacture of, warhead components or changes to operational procedures.

Surveillance

We will continue our core surveillance program for annual sampling of a small number of stockpile units for inspection. In addition an Enhanced Surveillance Program will develop a new suite of tools and technologies to allow us to predict, up to 10 years in the future, problems that may occur in the enduring stockpile. Examples of these technologies include:

- neutron radiography and scientific experiments in material science to characterize aging-related phenomena.
- resonant integral spectroscopy, which detects broken or damaged joints and degraded mechanical components;
- resonant ultrasound spectroscopy, which detects changes in properties of materials and parts as well as imbedded defects; and
- Superconducting magnetic field technology to detect corrosion;

These enhanced tools will enable us to anticipate the need for DOE to acquire or expand its manufacturing capacity *before* serious problems affect the stockpile. Enhanced surveillance will link science with the traditional core surveillance program in a way analogous to the interaction of biomedical research and clinical medicine; that is, we will not try just to address the symptoms of disease, but to understand the causes.

Assessment

Each time our surveillance activities uncover a potential problem in a stockpile system, we will rely on a combination of expert judgment, data retrieved from 50 years of nuclear testing, and modem calculational tools and experiments to fully assess safety and performance. Our investigation must be thorough and will require new tools to provide accurate predictions of stockpile performance for our military customers. Examples of assessments may include accident safety scenarios, weapon performance calculations with observed defects in stockpile components, and evaluation of the effects of aged weapon materials. The accuracy of these assessments will be paramount in providing expert technical judgments to the Department of Defense (DOD). Serious problems which may arise in the future could require consideration of the removal of a system from active inventory or modification of components. I take this stockpile assessment responsibility to be one of the most important in my role as Laboratory Director.

Response

Should the DOD and the DOE agree that action must be taken to correct an observed or predicted stockpile defect, the Laboratory must be ready to propose response options that:

- meet the needs of the military customer,
- can be certified,
- can be assured with high reliability, and
- can be produced within the national regulatory environment within DOE facilities.

The DOD clearly anticipated that responses of this type may be required in the future when it provided the basic DOD requirements for the nuclear weapons infrastructure in the Nuclear Posture Review. These requirements include demonstrating the capability to refabricate and certify weapon types in the enduring stockpile, as well as maintaining the capability to design, fabricate, and certify new warheads, although no new production is now anticipated.

What is required for success in this new paradigm?

To solve the problems that will confront the nation in this new era, the Laboratory is developing the enhanced capabilities required in computing, hydrodynamic studies, and materials science. Of course these new capabilities must complement the solid foundation provided by the core stockpile stewardship program. A dedicated national effort will be required to keep the core program strong so the next 50 years of the nuclear era will be as safe and successful as the last 50 years.

Core Stockpile Stewardship

The Core Laboratory Stockpile Stewardship Program underpins the technical basis for all U.S. nuclear weapons in the stockpile. Through this core program the Laboratory performs the fundamental research, the development of physical models, the integration of computer simulation codes, the experimental validation and the systems engineering which are required for the certification of stockpile systems. In addition the core stockpile stewardship program sets all technical specifications for manufacturing and surveillance operations as well as for maintenance activities conducted by the DOD. As part of the improved fundamental base needed for stockpile stewardship, we are performing experiments:

- to characterize the high stress properties of plutonium
- to establish the implosion characteristics of our current stockpile systems, and
- to verify safety assessments which ensure that all changes in procedures and operations are conducted with the highest standards of safety.

We are also working on issues involving the dismantlement of the retired stockpile, surveillance of warheads, and development of modifications for weapons in the stockpile. The Stockpile Life Extension Program is an example of an application of core capabilities to sustain the nuclear weapons that will remain in the stockpile and to extend the service life of warheads well beyond the original design life of each.

One of our most important responsibilities is to ensure that critical information from 50 years of nuclear weapons testing and development is properly preserved and transferred to formats that will enable this data to contribute to resolving future issues. We are formally reformatting Laboratory-wide records, from design calculations to engineering drawings, for electronic storage that will be accessible to future scientists. In the absence of nuclear testing, new computational models can be benchmarked with this existing nuclear weapons testing archive.

Without additional nuclear testing and new warhead development, science-based stockpile stewardship will require that the core stockpile stewardship program continue to provide the foundation of accurate and complete scientific on which all future stockpile surveillance, assessments, and modifications will be grounded.

Enhanced Computing Capabilities

Perhaps more than any other technology component of science-based stockpile stewardship, we will depend on high-performance computing and computational simulations to continue to validate and certify the safety, reliability, and performance of the nuclear package in the complete absence of nuclear testing. For decades, we have used computing as an extremely effective and critical tool in the design and development of new warheads, but its utility has always depended heavily on nuclear tests to supply specific data to calibrate the physics models in our codes and to proof test a formal design. We must now take the lead in producing unprecedented advances in new computer hardware and software in order for computing to fulfill its new role of predictive simulations that can reliably assess the effects of aging and engineering modifications without new nuclear tests.

The Accelerated Strategic Computing Initiative (ASCI) was begun this year to develop a series of new nigh-fidelity computer simulation capabilities to predict a warhead's safety and nuclear performance and the fundamental effects of aging and reconstitution on its nuclear components. These codes will of course require all of the data that can be obtained from new experimental facilities (discussed in the next section) as well as archived data from past nuclear tests to develop and verify the necessary physics models. Code development will depend on our strong science base, long supported by the core program at Los Alamos, in such disciplines as weapons physics, materials science and numerical applied mathematics.

In order to run these codes effectively, Los Alamos and the ASCI program will also form R&D partnerships with the computing industry to develop computers and their supporting software a ten-thousand-fold more powerful than the largest machines readily available today. This dramatic gain will be accomplished in less than one decade rather than the three decades which would normally be required.

Los Alamos has pioneered the use of parallel computers in weapon safety assessments. We are now taking the lead in pursuing a new parallel computer design approach that involves clustering together hundreds of thousands of relatively low-cost, high performance commercial multiprocessor servers. We will establish a competitively-selected industry contract to develop this approach in the next few months. This contract and a supplemental procurement by our Advanced Computing Laboratory will build Los Alamos' computing power to four Teraflops in 1998 and will constitute another major step forward in our continuing world leadership in high performance computing and predictive simulation. We must maintain this leadership for us to do the job we have been assigned.

During the last week of 1995, Los Alamos weapon designers performed four very special calculations to assess the nuclear performance implications of an essential engineering modification that will be required to maintain a warhead in the active stockpile. These calculations ran 1,500 hours of equivalent Cray Y-MP processor time each. We were in fact fortunate that the specific engineering change could be explored with a two dimensional calculation requiring one million computational cells. In general, future stockpile assessments will require three-dimensional calculations, which in turn need 1000 times the computing memory and would take 100 years to perform on current machines. ASCI is an essential tool for computational assessments for stockpile stewardship.

Above Ground Studies of Weapon Performance

Understanding the hydrodynamic behavior of materials under extreme conditions is the single, most crucial component of the science of nuclear weapons design and performance. Improvements in computing will largely focus on large-scale simulations of hydrodynamic properties of implosions. These simulations will have to be validated by laboratory experiments. Let me focus for a moment on several important experimental facility-related initiatives at the three weapons Laboratories which have been designed to elucidate the physics of nuclear weapons without nuclear testing. Clearly, no single laboratory experimental facility can reproduce all of the physical conditions of a nuclear weapons. Therefore, the Laboratories have defined a suite of complementary experimental facilities which allow us to focus on different aspects of the physics of nuclear weapons.

Dual-Axis Radiographic Hydrotest Facility. The Dual-Axis Radiographic Hydrotest (DARHT) facility at Los Alamos is our highest priority among the experimental capability initiatives. DARHT will house a pair of advanced electron accelerators that will generate x-rays to provide high resolution images of dense materials shocked or imploded by high-explosive detonations. Because two axes are planned, we will be able to make essential time-resolved or three-dimensional measurements (similar to a CAT scan) on nonnuclear implosions with sufficient accuracy to observe changes caused by aging processes. We also expect to incorporate improved accelerator technology into the second axis. DARHT's capabilities are essential to improving our understanding of hydrodynamic behavior of aged warhead pits and will be crucial in stewardship of the stockpile without additional nuclear testing. As the facility is developed, a phased implementation of containment of the debris will provide increasing environmental protection. The Department recently completed an environmental impact statement and a record of decision on DARHT. Construction is currently suspended until a current court injunction is lifted. We anticipate that this will happen in 1996. Since radiographic hydrotesting is at the top of our urgent needs list, we are continuing to fund advancements in technologies that would be used in future hydrotest facilities. This effort, funded from our core stewardship program, has resulted in advancements that could be implemented into the second axis of DARHT. These advancements in technology will enable multiple pulses (up to four) from a single accelerator during a test resulting in multiple images of the same implosion experiment at critical times.

Continuing to advance the tools available for hydrodynamic studies and experiments will remain a top priority and one in which the nation must continue to invest to ensure that stockpile stewardship under a comprehensive test ban is successful. At Los Alamos I have directed that investigation of additional technologies for improving this field be explored. One recent development that appears promising is the application of proton radiography for nuclear weapon applications. Proton radiography, which is currently under development at LANSCE, has the potential for increased penetration not achievable by traditional x-ray techniques.

Pulsed Power Experiments. Pulsed power in the microsecond regime, in current use at Los Alamos, enables highly precise, macroscopic hydrodynamics experiments associated with the physics of weapon primaries and secondaries. We will use these experiments to benchmark hydrodynamic calculations associated with potential physical defects caused by aging. In fiscal year 1996, we received the first line item funds for our next generation pulsed power experiments facility, ATLAS, and preliminary design is underway. ATLAS is projected to be complete in 1999 and will provide capabilities to conduct weapon-related experiments to investigate implosion hydrodynamics and the behavior of materials at high strain rates.

During the past few months Los Alamos weapons designers have fielded a very successful experimental campaign on the nanosecond SATURN pulsed power facility at Sandia National Laboratory. Nanosecond pulsed power can generate a very powerful radiation source for radiation hydrodynamics experiments. We anticipate expanding our collaboration with Sandia on radiation flow experiments when the PBFA–Z facility becomes available in a few months.

Laser Experiments. High-energy lasers and electrical pulsed-power facilities are complementary tools in addressing high-energy-density physics associated with nuclear weapons stewardship, making different aspects of the high-energy density regime accessible to experiments. Los Alamos has for a number of years conducted Inertial Confinement Fusion (ICF) and weapons physics experiments at the NOVA laser at Lawrence Livermore National Laboratory.

The National Ignition Facility (NIF), which will be sited at Livermore, will be able to approach the temperatures and pressures that occur in a nuclear weapon on a small scale. NIF will provide an experiment facility for the study of thermonuclear ignition in ICF targets. Weapons physics applications at NIF will include investigations of plasma equation-of-state properties, hydrodynamic instabilities, opacity, and radiation transport.

Material Science Applications for Nuclear Weapons

As the stockpile ages our focus must also change to place greater emphasis on the science of aged weapon materials. For example: organic materials, such as high explosives, will degrade over time and will have to be replaced; outgassing of organic materials may also lead to corrosion; cracks or voids will likely develop in some components and assessments of the impact on performance will require additional research to accurately characterize such defects; radioactive decay products which will build up over time in the plutonium components and the change in material properties must be more confidently assessed; and minor but potentially important dimensional changes will occur in the weapon systems. These effects due to aging must be characterized and integrated into our codes and experiments to enable accurate assessments and predictions of future weapon performance.

Application of Neutron Beams. Researchers are using the Los Alamos Neutron Science Center (LANSCE) to address many issues associated with aging by applying highly developed materials science expertise in neutron diffractometry, small-angle scattering, reflectometry, and inelastic scattering. LANSCE is already supporting improved fundamental understanding of the science underlying models for predicting the behavior of explosively compressed plutonium, the surveillance of light materials deep inside an aging nuclear device, and the study of the performance and sensitivity of high explosives. The high-intensity, high-energy neutron beams are also useful to test methods for locating defects nondestructively with neutron radiography. There are many smaller yet exciting research developments as well. LANSCE operated with its highest reliability ever last year and is scheduled to increase the number of experiments in support of stockpile stewardship as well as Accelerator Production of Tritium in the coming year. I believe that LANSCE will continue to demonstrate its long-term importance to the weapons program by applying new techniques to study key stockpile issues.

Subcritical Experiments at the Nevada Test Site. Plutonium components in our nation's stockpile were normally retired before reaching 25 or 30 years of life. This new era of stewardship will require that we increase our confidence in the performance factors associated with aged plutonium and other weapon materials. Subcritical experiments, consistent with a zero-yield CTBT, at the Nevada Test Site will address these concerns by obtaining data which will enable us to more accurately calculate the behavior of these materials in extreme environments.

What is the Product?

The product of stockpile stewardship will be the life extension and revalidation of weapons in the enduring stockpile without reliance on nuclear testing. Responses to observed or predicted problems will be implemented to ensure that the requirements of the DOD are met. In January 1996, the DOE and the Laboratories implemented a new, robust form of peer review for warheads. Los Alamos, in concert with Lawrence Livermore National Laboratory, embarked on a 4 year study of the W76 warhead for the Trident I missile, the first warhead to be revalidated by this process. Two independent teams will review archival data, recalculate weapons performance, investigate surveillance data, and conduct new experiments and computer calculations. This new process will require the effective use of historical data as well as the latest advanced technologies to determine if the warheads in the remaining stockpile are safe and reliable, to predict if potential problems lie ahead, and to propose and develop modifications that will ensure the reliability of our nuclear deterrent. Stockpile stewardship must not only provide confidence to the DOD customer in the near term, it must also ensure that we make the right choices today so our ability to provide that confidence remains strong over the long term.

Stockpile Management

An essential element of DOE's strategy to assure the safety and reliability of the nuclear weapons stockpile is the capability for the maintenance, surveillance, and refurbishment of the weapons stockpile. This stockpile management element is the necessary complement to stockpile stewardship. The DOE has just released its draft of the Stockpile Stewardship and Management Programmatic Environmental Impact Statement (SSM–PEIS). The announced preferred alternative in the SSM–PEIS is to downsize in place at some production plants and transfer other assignments, where appropriate, to the Defense Program laboratories. I believe that the significantly reduced production requirements combined with no nuclear testing and long lifetime requirements for weapons in the stockpile will require a tightly integrated R&D effort, an enhanced surveillance activity, and a flexible remanufacturing system. The preferred alternative will require very close collaboration between the laboratories and the remaining plants. At Los Alamos, we have already seen the benefits of such integration in improving the quality and lowering the costs of those surveillance and manufacturing operations that have been transferred to us from the plants at Mound, Pinellas, and Rocky Flats over the past year. Let me present a few specific examples.

Pit Surveillance and Rebuild

In pit surveillance, we met our annual goal of evaluating 19 surveillance pits 1 month ahead of schedule, introduced scientific evaluation methods, converted surveillance and inspection records to electronic storage, established a CD-ROM reporting format, and linked surveillance and archiving for the first time.

In pit rebuild, we completed the transfer of necessary Rocky Flats hardware and gauging equipment, developed a smaller and more accurate inspection gauge, eliminated a hazardous fluid previously used in density measurements, switched to dry machining so that we could eliminate chlorinated hydrocarbons and fluorocarbons for component cleaning in favor of recyclable supercritical carbon dioxide, and initiated a modern and simpler quality control program for production.

Detonator Manufacturing

With the shutdown of operations at the Mound Plant in Ohio, the Department assigned detonator evaluation and manufacturing responsibility to Los Alamos. We have demonstrated the capability to perform the evaluations; completing the first one late in 1995. Included in the assignment to fabricate detonators for the future stockpile is the design and manufacture of detonator simulators used in stockpile evaluation flight test units. Though these simulators do not actually enter the nuclear stockpile, we have demonstrated the ability to meet the same rigorous war-reserve quality standards as those required for stockpile components.

Fabrication Support

In fiscal year 1995, we also demonstrated the capability to manufacture other parts used in the physics package 50 that we could support our local hydrotesting program. For example, we cold pressed to specified density and machined several lithium salt parts, measurably reducing waste generated. We also fabricated our most challenging nuclear package case from a uranium alloy. Finally, we are making good progress in the process of casting uranium to nearly final shape.

Neutron Generators

Los Alamos also was assigned responsibility for the tritium loading of neutron tubes for a neutron generator designed by the Sandia National Laboratories. Although it was expected to take up to 5 years to transfer the skills needed to perform this work, Los Alamos researchers applied their knowledge of tritium hardware and processes and transferred the production capability to the Laboratory with significant improvements. The result is a system that is providing deuterated targets and will provide tritiated targets to Sandia National Laboratories for incorporation into neutron generators on schedule within months instead of years. The improved process also reduced radioactive waste generated by 90 percent.

Plutonium Pit Manufacturing

The preferred SSM–PEIS alternative for pit manufacturing calls for a limited-scale production of pits at the Los Alamos TA–55 plutonium facility, the only facility in the nation currently able to tackle such an assignment. We are aggressively supporting this decision because we believe that pit manufacturing at the level of approximately 50 pits per year would greatly complement our current R&D and surveillance missions, while concurrently saving the taxpayers a lot of money.

We are developing a plan that would put in place the capacity to build 50 complete pits per year on a single-shift basis. The interior equipment and utilities in one wing of the plutonium facility will be rearranged so that we have an integrated production and R&D area. To meet the projected build requirements of the military, we are placing the plutonium facility project on a fast-track internal validation and review for submission as a new construction start in the fiscal year 1998 budget.

We will be in very limited pit production for the W88 warhead for the Trident II pit rebuild program (rebuilding units destroyed in surveillance) during fiscal year 1998. Getting started as soon as possible is important to meet the Navy's requirements and to capture the pit production knowledge base before it is lost. No war reserve pits have been manufactured in the United States since Rocky Flats shut down its plutonium operations in June 1989. By employing the integrated R&D, surveillance end remanufacturing paradigm, we expect to improve the existing fabrication processes, minimize waste generation, and reduce worker radiation exposure. In addition, the hands-on manufacturing operations will help to maintain rigorous nuclear weapons safety practices among our scientists, engineers and technicians.

We are also teaming with colleagues at Lawrence Livermore, Savannah River, and Pantex to develop contingencies for larger-scale pit-production requirements. We expect to learn much from the W88 pit rebuild program and the 50-pit manufacturing module at TA–55 that would allow the team to design a modular, large-scale production capability that could be deployed rapidly should requirements change. I should add that such teaming is also occurring with Savannah River, Pantex, Allied-Signal Kansas City, and the Y–12 plant to address other nuclear weapons component production capabilities. In all cases, we will use the integrated R&D, surveillance, and remanufacturing paradigm.

Nuclear Facility Upgrades at Los Alamos

In addition to the TA–55 facility upgrade to handle the small-scale pit manufacturing mission, Los Alamos has two other facilities that will require substantial upgrades or life extensions to meet the missions envisioned in the SSM–PEIS. The Chemistry-Metallurgy Research (CMR) building and the Nuclear Materials Storage Facility (NMSF). The CMR building is 44 years old and houses the analytical chemistry laboratories that are crucial to the operations of the TA–55 plutonium facility. Plutonium operations at TA–55 would shut down within weeks if the CMR building were to be shut down. The CMR facilities also provide the nuclear material standards for all other sites through distribution by the New Brunswick Laboratory. Upgrades of the CMR have been ongoing for the past few years. We expect continued funding to be included in the President's fiscal year 1997 budget submission.

Since Los Alamos recently took over the pit surveillance program we will also be in desperate need of renovating the Nuclear Materials Storage Facility because the vault at TA–55 is projected to be at capacity by the year 2002. The renovation project of the NMSF is needed to allow it to accept special nuclear material in that time frame. The total project cost is $56.7 million, and is expected to be funded in the fiscal year 1997 DOE/DP budget as a new start.

Collectively, these three facilities projects provide the foundation for maintaining our ability to meet the Department's plutonium needs, including surveillance and limited pit manufacture, in a safe, reliable, and environmentally responsible manner. These modernized facilities represent the cornerstone for ensuring the continued reliability of primaries in the nuclear stockpile.

Tritium Supply

In December 1995, the DOE announced a dual track approach to ensure a supply of tritium for the nuclear stockpile. This dual approach involves a commercial, light-water reactor path, either purchased or leased, and an Accelerator Production of Tritium (APT) project. Los Alamos is the technical lead for APT but we are collaborating closely with Westinghouse which operates the Savannah River plant which has been designated as the preferred production site for APT if APT is selected as the preferred technology. We are also working closely with Brookhaven, Lawrence Livermore, and Sandia National laboratories. This team will be augmented by a prime contractor to manage the construction project in August 1996.

The activities at Los Alamos are focused on engineering design and development over the next 3 years to reduce the cost- and schedule-risk associated with the project. We are prototyping system components to understand costs and fabrication issues and are investigating new technologies that project 20–40 percent savings in the estimated operating costs of $200 million for the APT plant. Technical risk for the project is relatively low based on evaluations by independent expert review committees. We passed a significant milestone this year by constructing and operating a prototype of the first stage of the accelerator that met its technical requirements.

I am confident that this project is on track to start tritium production at Savannah River in 2007. However, I do have concerns that the budget profile for the next 2 years (fiscal year 1997–1998) is not consistent with a 1998 decision between the commercial reactor and APT. The combined fiscal years 1997–1998 budget amount is adequate but the fiscal year 1997 level of $85 million is low by about $45 million to achieve all the milestones prior to the decision point.

This is an exciting project for the laboratories, industry, and the DOE. It involves an important national problem and uses the core competencies of all of the participants in an effective manner. I believe APT will produce tritium for the country in a reliable manner with minimal environmental impact.

Los Alamos' Approach to Stockpile Stewardship and Management

Our approach to stockpile stewardship in this new era supports the national goals of ensuring the highest standards of confidence and reliability in our stockpile without reliance on nuclear testing. Our approach is science-based to ensure that no fundamental detail of weapons science or engineering is overlooked. This approach will be complemented by nonnuclear experiments, inspection and surveillance of stockpile weapons, and state-of-the-art calculational codes to simulate and predict every aspect of weapon performance. We will, in partnership with the plants and our DOD customer, ensure that the necessary modem manufacturing infrastructure is in place to meet the future needs of the stockpile in a timely way. My responsibility, as Director of the Laboratory, for certifying the health of the Los Alamos warheads in the stockpile, can only be met through a comprehensive, integrated program of surveillance, assessment, and response I have outlined above.

THE CHALLENGES OF PROLIFERATION, NUCLEAR MATERIAL DISPOSITION, AND CLEANUP

Beyond ensuring a safe, effective, and reliable nuclear deterrent now and in the future are other significant challenges involved in *reducing the global nuclear danger*. We must help ensure that the capability to produce nuclear weapons and other weapons of mass destruction does not spread to other nations or terrorist organizations; we must secure the safe storage and disposition of many tons of plutonium and highly enriched uranium; and we must help clean up the legacy of 50 years of nuclear weapons development and production. This involves efforts both here and abroad to develop new technologies as well as to apply them.

Nonproliferation and Verification Activities

The proliferation of weapons of mass destruction (nuclear, biological, and chemical) and possible terrorist use of these weapons remain a major national security issue. Recent developments, from allegations of nuclear smuggling out of the former Soviet Union, to the terrorist use of nerve gas in a crowded Tokyo subway, to the rapid diffusion of technologies applicable to the manufacture of biological weapons, have heightened awareness of this threat.

The principal technological measures for responding to such a threat consist of controls on sensitive materials, weapons and technology; early detection of potential proliferators and proliferation pathways; and the ability to respond to threatened attacks with effective interdiction and protection measures. Adequate intelligence and monitoring capabilities require the application of leading edge science and technology across a broad spectrum.

High priority should be given to intelligence collection and threat assessment as a tool in developing national response options. Equally, better detection, monitoring, and data collection technologies are needed across the spectrum of nuclear, biological and chemical threats. Adequate preventive measures, including verifiable arms control agreements as well as export controls for some of the threats are also lacking. A key to the success of this effort will be a strong R&D program to support technology development and evaluation and assessment activities across Government agencies. The best talent of the Defense Program laboratories should be brought to bear to meet these challenges.

The Defense Program laboratories are developing much of the technology that will be used to verify a Comprehensive Test Ban Treaty. This includes technologies for the international monitoring system such as infrasonics, hydroacoustics, radiochemical sampling, and seismic monitoring at regional distances. In addition, at Los Alamos and Sandia, we are developing sensors for new U.S. satellites that will fly after the year 2000 to verify the Comprehensive Test Ban and monitor for nuclear explosions worldwide. Confidence building measures to encourage compliance with the zero-yield threshold will also be vital to provide the necessary assurance that other nations are acting in good faith.

Lab-to-Lab Initiatives

Starting in 1994, at the behest of then DOE Undersecretary Curtis, Los Alamos took the lead in responding to concerns regarding the control of weapons and nuclear materials in the former Soviet Union by suggesting a "laboratory-to-laboratory" approach to the problem. In 1 weekend the principle was accepted by scientists at Arzamas-16. Within 6 months we were demonstrating the first complete nuclear material control and accountability system with the Russians at their key facilities.

Now, all the major Russian Ministry of Atomic Energy facilities have become participants in the program, along with six U.S. national laboratories. As an example of an early result, we took several components that constituted a major facility demonstration at Arzmas-16 and installed them at, the Research Institute for Physics and Engineering in Obninsk. This facility, with two critical assemblies, now has 800 kilograms of plutonium and 2.3 tons of highly enriched uranium under positive safeguards. We are planning to help the Russians field safeguard systems for their weapons assembly and disassembly plants as well. At the current rate, we expect the Russians to have all of their weapons-grade nuclear material under strict control in 5 to 7 years.

The window of opportunity we have open to us now must not be lost. We need to expand these efforts as expeditiously as possible to include protection of the materials at the nuclear sites, as well as detection of theft or diversion of these materials. In the meantime we need to continue to support our nuclear emergency search capability, in case control efforts should fail.

Nuclear Material Disposition

The U.S. also faces an enormous challenge in managing and safeguarding the huge quantities of nuclear materials from dismantlement of its own nuclear weapons, as well as material remaining at former production plants. The latter challenge involves tons of plutonium and highly enriched uranium in a variety of forms in many locations. We must move expeditiously to convert these materials to highly protected, storable forms, while at the same time maintaining adequate safeguards.

Los Alamos provided technical support in material stabilization to the new management contractor at Rocky Flats Plant, including input to project plans, peer review of proposals, development and demonstration of specific processes, and on-site training for the Rocky Flats operations staff. Last December, we also assisted as a ton of plutonium oxide was placed under International Atomic Energy Agency (IAEA) safeguards at the Rocky Flats site. We are leading the development of a novel Automated Retirement and Integrated Extraction System (ARS) for plutonium components to convert the cores from dismantled nuclear weapons into unclassified forms suitable for safe storage and safeguards monitoring. The ARIES process for dismantling pits has virtually eliminated aqueous waste streams, cutting future costs dramatically. ARIES, which won an R&D–100 Award, is also being developed as a modular process for potential application to the stabilization of Russian nuclear material.

In support of materials disposition efforts, Los Alamos has studied the phenomenology of plutonium metal and oxide in storage in order to develop criteria for safe long-term storage of these materials. Material characteristics that could result in corrosion or pressurization of sealed storage containers were analyzed to provide the fundamental technical basis for safe long-term storage of plutonium. We have since packaged twenty five canisters of plutonium that meet the long-term storage criteria in unclassified form potentially acceptable to the IAEA. The plutonium is contained in two nested stainless steel cans that are welded and individually leak tested. This activity will continue through the next several years to stabilize and repackage the Los Alamos plutonium inventory. Los Alamos is currently the only site with plutonium in approved long-term storage.

Environmental Management

We must also continue to work to provide the most cost-effective program of environmental remediation and waste reduction to reduce the danger from the legacy of 50 years of nuclear weapons development and production and to integrate these efforts with waste minimization from continuing activities. There is an urgent need to coordinate efforts in reducing the amount of waste produced and upgrading waste processing facilities. For stockpile stewardship and management to be successful, it must avoid long-term environmental costs and address critical production risks and vulnerabilities.

The national laboratories have the technical expertise and the engineering capability necessary to support developing and applying advanced technology to meet near- and long-term environmental challenges across the DOE complex. In addition to the ARIES process discussed earlier, two other Los Alamos technology developments with application to waste minimization issues received R&D–100 Awards last year. We developed a new type of chemical microsensor that can be used to monitor airborne organic contaminants that unlike earlier types, can be made specific to particular compounds and that has long-term stability. Our researchers, with collaborators from Boeing, also developed a polymer filtration system to recover heavy metals from electroplating solutions, a technology that could avoid the formation of more than 50,000 tons of metal-containing sludge annually.

We are also applying our expertise to assist the Department in its remediation efforts at other sites. We have assisted in the characterization of the waste in the high-level nuclear waste storage tanks at Hanford, delivering the first comprehensive estimate of the chemical contents of these tanks. This effort has resulted in new safety assessments that will allow more complete characterization and eventual retrieval of tank wastes.

Because Los Alamos has significant waste-generating operations, it has hands-on knowledge of the processes that must be improved to generate much less waste. The Laboratory is working to ensure that waste minimization and pollution prevention play a pivotal role in all our activities. As our waste management operation becomes more sophisticated, we will have less need to handle "end-of-pipe" problems; instead, we will focus on preventing waste from entering the pipe.

We have also made significant progress in environmental restoration at our own site. We cleaned up 46 contaminated sites and completed the decontamination and decommissioning of several buildings in our former plutonium fabrication area (the predecessor to the Rocky Flats Plant), reducing the airborne emission of radionuclides from this facility by 90 percent. Nearly 900 potentially contaminated sites have been evaluated and closed out, needing no further action. Between 70 and 120 contaminated sites are slated for cleanup in the next year, depending on funding levels.

KEEPING THE LABORATORY VITAL IN THE LONG TERM

The Laboratory's identity and international recognition rest upon its sustained performance in satisfying national needs in science and technology and in the quality of the science and technology it applies to its mission. It is no coincidence that Los Alamos is embedded within a major research university. Association with the University of California not only assists us in recruiting the best talent available, it reminds us that science and excellence provide the basic foundation for success in our mission. We can take the long-term view of a Government laboratory, yet we have the talent that allows us to move rapidly into emerging areas of science and technology. A good example of the synergy that occurs between basic science and our mission was recognized last fall when Fred Reines, now Professor of Physics-Emeritus at the University of California-Irvine, received the 1995 Nobel Prize for Physics for his discovery, with the late Clyde Cowan and others, of the free neutrino. The 1953 discovery by these two Los Alamos researchers, was made possible by the development of large liquid scintillation detectors at Los Alamos.

Programs in civilian science and technology, supported by other Department of Energy offices such as the Office of Energy Research, as well as work for other Federal agencies in the civilian and conventional defense sectors, help support capabilities necessary for the performance of our national security mission. Further, maintaining the quality of the Laboratory's work requires that our scientists be integrated into the broader scientific and technical community. Whether in basic research, the human genome or other bioscience programs, materials R&D, energy technologies, high-performance computing, space systems, or the application of Laboratory-developed technologies to industry, activities in civilian and conventional defense R&D serve important national needs while helping to maintain the vitality of the Laboratory. As we apply our core competencies to these needs, we advance those competencies needed for the weapons program and enhance the reputation of the Laboratory for quality science and technology. In these areas, we interact strongly with university researchers, and we are increasingly working in partnership with industry to help meet mission requirements.

Industrial partnerships are a critical factor in accomplishing our mission. Support for these partnerships was initially prompted by the Government's desire to encourage effective utilization of technologies developed within the national laboratories at taxpayers' expense to help U.S. industries compete successfully in the global marketplace. We find that today the strongest rationale for these partnerships is that they are a business necessity for the laboratories to meet their own national security mission responsibilities.

The laboratories have much to learn from industry, both technically and from industry's operational best practices. Industry provides technical challenges that exercise and stretch the skills of our best scientists, thereby maintaining and enhancing capabilities for defense missions while helping the laboratories to provide the breadth of projects that enable them to continue to attract top quality scientific personnel.

For example, the Laboratory has been developing large-scale plasma source ion implantation, a technique pioneered at the University of Wisconsin, in a partnership with General Motors. General Motors has been willing to invest in the partnership because of its interest in the ion implantation to extend the life of cutting tools. The weapons program is benefiting directly from this work in two very different applications. The plasma expertise maintained by this project has been applied to ion implantation of ceramic metal-oxide components for nuclear weapons. In addition, large-scale plasma processes are being explored to strip plutonium contamination from objects like glove boxes, making them much easier to dispose of or making them suitable for reuse.

The nation's R&D enterprise will be strongly networked in the future. The Laboratory must be an integral part of that network. To be the best in science, we will have to work closely with universities. To be the best in technology, we will have to work closely with industry.

BUDGET RESOURCES AND HOW EFFICIENTLY WE USE THEM

Over the past 2 years the Department of Energy, with input from the military and in conjunction with the defense laboratories, has developed a sound plan for stockpile stewardship and management to the year 2010. This plan is responsive to the immediate needs of the military customer and it also provides me, as director of the Los Alamos National Laboratory, with the best hope to assure stewardship in the year 2010 and beyond in the absence of nuclear testing.

As I have pointed out above, the absence of nuclear testing and the inability to replace old designs with new ones represents a new paradigm for nuclear weapons. It will be very difficult and it will require substantial resources. This problem is exacerbated by the fact that the old DOE production complex is outdated and not well suited to do the necessary component manufacturing in the future. In developing the stockpile stewardship and management plan at the time of the President's decision to seek a zero-yield CTBT, we identified the need for a $4 billion budget for DOE Defense Programs for fiscal year 1997, increasing slightly for close to 10 years, before decreasing to a steady state of approximately $3 billion in the out years.

At Los Alamos, we shoulder an especially heavy load because we will be the stewards of the majority of the weapons systems in the enduring stockpile. We will have to provide the core support for the current systems, develop enhanced surveillance techniques to ensure the future health of the stockpile, strengthen the tools that we will need to compensate as best we can for not being able to conduct nuclear tests, and ensure the nation's ability to remanufacture key components of weapons systems. Our Laboratory has an urgent problem of providing adequate funding to replace retirees in a few key skill areas, update and maintain our facilities (many of which are one-of-a-kind), as well as to operate our facilities safely and in an environmentally acceptable manner.

All of this translates to a need for a DOE-Defense Programs budget of $4 billion in fiscal year 1997 for Weapons Activities. We have not yet received official notification of the President's budget request. However, any reduction below the $4 billion level will not allow us to build the required foundation for the stockpile stewardship and management program. We would be forced to choose between cutting back our support for current systems and constructing the building blocks for the future. Neither is acceptable in my opinion. I say this with full knowledge of the great dilemma that Congress and the President face in trying to achieve a balanced Federal budget. I ask for this committee's understanding and strong support of our needs.

I recognize that to gain your support we must demonstrate not only that we have a compelling national mission but that we spend the taxpayers' money effectively. We have to demonstrate that Government organizations, like private companies, are serious about reducing costs and increasing productivity. Working with the Department of Energy, we are trying to take unproductive, bureaucratic work out of the system and to reduce our overhead costs by eliminating positions no longer required. The Laboratory took a big step in this direction with the elimination of 915 positions last fall, saving an estimated $60 million in overhead expenses.

SUMMARY

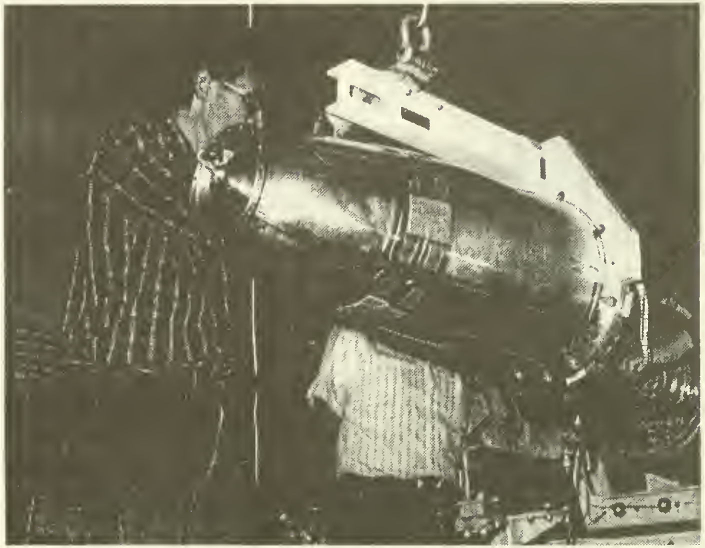
It is now time to get on with the job of science-based stockpile stewardship—putting together the expertise and the experimental and theoretical apparatus to make the job possible. This is a job that has never been done before and in many ways is a greater challenge than any we have faced in over 50 years of nuclear weapons design and development. At the same time we must continue to ensure that our nuclear weapons are safe, secure, and reliable with vigorous management of the stockpile through surveillance, assessment, and remanufacturing, if necessary. We must also address the issues of disposition of nuclear materials here and abroad, the threat of proliferation of weapons of mass destruction, and the efficient cleanup of 50 years of nuclear weapons development and production.

We are on our way to a new world in nuclear weapons stewardship. To complete the job we must have the sustained support of the Department of Energy and the Congress. I thank you for giving me the opportunity to address these issues and I look forward to working with the Committee to assure that our nuclear deterrent forces meet the nation's needs now and in the future.

LALP-96-12
. UC-700
Issued: March 1996

Nuclear Weapons Stewardship
Los Alamos National Laboratory

Los Alamos, New Mexico



Los Alamos
NATIONAL LABORATORY

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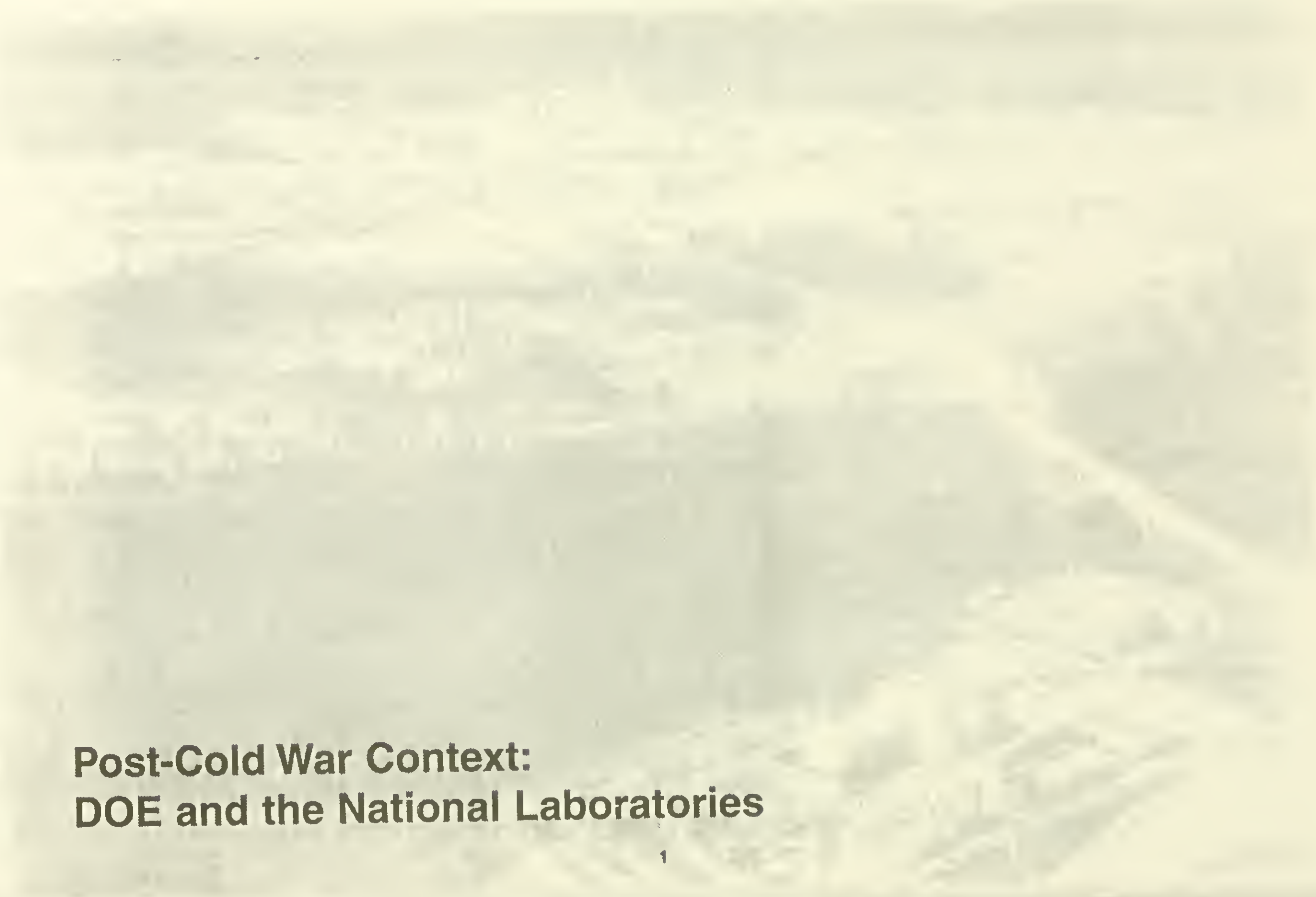
This document focuses mainly on how Los Alamos National Laboratory will support national security by ensuring the continued safety, reliability, and effectiveness of the enduring nuclear weapons stockpile. The Laboratory can provide additional information on its other national security programs (for example, those related to environmental management and the plutonium legacy), which are covered only briefly in this document.



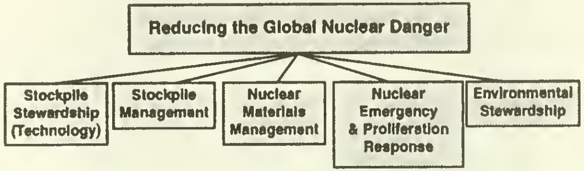
Post-Cold War Context:
DOE and the National Laboratories

Reducing the Global Nuclear Danger

Changing Priorities for the Nuclear Weapons Program

The geopolitical changes of the last several years (including the collapse of the Soviet Union and the end of the Cold War) have led to major arms control agreements, reductions in the planned size of the U.S. nuclear force, a move away from "traditional" nuclear targeting strategies, and a shifting rationale for deterrence. Additionally, the reduced nuclear threat has altered the public's acceptance of the perceived risks of nuclear weapons ownership and the legacy of 50 years of Cold War weapons production.

Because of these changes, the central mission of the U.S. Nuclear Weapons Program has shifted away from developing and testing nuclear weapons to ensuring that the smaller stockpile is safe, secure, and reliable, as part of reducing the global nuclear danger. This helps to assure long-term global security in a world that uses nuclear technology (securing the nuclear future).


Reducing the Global Nuclear Danger
Stockpile Stewardship (Technology)
Stockpile Management
Nuclear Materials Management
Nuclear Emergency & Proliferation Response
Environmental Stewardship

Post-Cold War Realities

Within the parameters of this new mission, the realities of the post-Cold War world must be addressed:

- Nuclear weapons and the knowledge of how to make them will not disappear from the world, so deterrence remains an essential element of U.S. national security.
- The United States entered a moratorium on nuclear testing in 1992 and has declared its intent to negotiate a comprehensive test ban.
- Given continued nuclear weapons deployment by several other nations, the United States must, for the foreseeable future, maintain a safe and reliable nuclear capability. This must be done in the absence of nuclear testing.
- Initiatives for stockpile reduction have resulted in a concomitant requirement for massive weapons dismantlement over the next several years in both the United States and the former Soviet Union. Accountability for and eventual disposition of excess nuclear material will challenge the international community.
- The greatly reduced stockpile and increased public concern about past environmental consequences of weapons manufacture have resulted in an increasingly clear mandate for a much-smaller, environmentally sound manufacturing and maintenance capability.
- The specter of more states or groups possessing nuclear weapons and other weapons of mass destruction makes the proliferation of such weapons a heightened concern. Questions of how to prevent, detect, and mitigate proliferation remain vital.

U.S. Defense Strategy in a Changing World

> *"We will retain strategic nuclear forces sufficient to deter any future hostile foreign leadership with access to strategic nuclear forces from acting against our vital interests and to convince it that seeking a nuclear advantage would be futile. Therefore, we will continue to maintain nuclear forces of sufficient size and capability to hold at risk a broad range of assets valued by such political and military leaders."*

President Bill Clinton
July 1994

A Pragmatic Approach

In spite of the recent dramatic geopolitical changes, the United States has reaffirmed most of its long-standing nuclear policies:

- Nuclear weapons are important instruments of U.S. national security.
- Global disarmament is not practicable in the foreseeable future.
- The need for a traditional nuclear deterrent, both central and extended, still exists.
- Russia, the world's other nuclear superpower, remains the principal focus of U.S. nuclear policy.

The United States is working to build cooperation and partnership with Russia. Nonetheless, that nation is undergoing major changes, so we must develop a pragmatic defense strategy that addresses all possible outcomes.

A Hedge against Unfavorable Outcomes

> *"Aspects of our programs constitute a hedge against the possible negative outcomes [of changes] now underway in Russia. . . . You cannot mothball intellectual capital—that's the basis for the research and development program. . . . It would take decades to reconstitute critical elements of the [defense] industrial base if we had to do it from scratch."*

Secretary of Defense William Perry
George Washington University
March 14, 1994

In implementing nuclear policy, the Department of Defense (DoD) has adopted a "Lead and Hedge" Strategy:

- Further arms reductions will be guided largely by the situation in Russia. The United States must maintain the necessary flexibility to reduce or reconstitute its nuclear force.
- If the Russian situation continues to evolve favorably, the United States should take the lead in proposing reductions beyond START II.
- As a hedge against possible deterioration of the Russian situation, the United States should preserve the expertise and technical base necessary for reconstituting its nuclear force.

> *"The continued maintenance of a safe and reliable U.S. nuclear deterrent is a cornerstone of U.S. national security policy."*

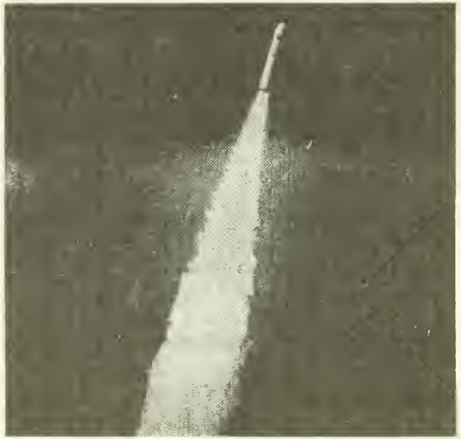
President Bill Clinton
November 1993

Nuclear Weapons in U.S. National Security Strategy

Capability-Based Deterrence

As the drawdown of the nuclear force progresses and the weapons continue to age, deterrence will be represented increasingly by the capability to maintain, modify, and perhaps reconstitute our nuclear forces. In other words, deterrence by capability (termed "capability-based deterrence") is being enhanced relative to deterrence by pretargeted nuclear forces.

Maintaining a credible technological capability will require careful planning. Our capacity for nuclear weapons maintenance, surveillance, modification, remanufacture, and certification will decrease along with stockpile reduction. At the same time, the aging of the weapons will increase the technical challenge in these areas.



DoD's Nuclear Posture Review identifies the following requirements for the nuclear weapons complex:

- Maintain nuclear weapons capability (excluding underground nuclear testing and fissile material production but remaining prepared to resume underground testing in a startup time of 2–3 years, if directed to do so).
  - Develop a stockpile surveillance engineering base.
  - Demonstrate the capability to refabricate and recertify warheads in the enduring nuclear stockpile.
  - Maintain the capability to design, fabricate, and certify new warheads.
  - Maintain a science and technology base.
- Ensure an appropriate tritium supply.
- Suspend new warhead design and production.
- Maintain the safety and security of stockpile warheads.

DOE's Nuclear Weapons Complex

The National Laboratories and Production Facilities

Within the U.S. Nuclear Weapons Program, the national laboratories and production facilities have played distinct but synergistic roles.

Historically, the weapons laboratories carried out weapons research, development, and testing (RD&T). They were and still are responsible for weapons design, engineering, certification, safety, and security. The laboratories support the nation's nuclear emergency and proliferation response activities, including analysis and assessment of emerging foreign nuclear technology (the Iraqi program, for example).

The nuclear weapons production complex has been responsible for producing components and materials, processing nuclear materials, and maintaining and dismantling weapons. Both the laboratories and the production facilities have had roles in materials management and stockpile maintenance and surveillance (monitoring).

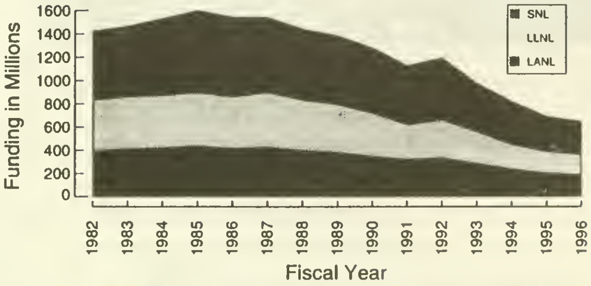
Changes in the Complex

Recent changes in the budgetary, environmental, and national security arenas have brought about the following changes:

- The operations of some major, one-of-a-kind production facilities have been curtailed. Some facilities—such as Rocky Flats—will never resume their previous roles. (Limited production is still required for stockpile stewardship and management; associated alternatives, including downsizing in place where applicable, are being evaluated in a programmatic environmental impact statement.)
- Certain stockpile management responsibilities (including pit surveillance and functions addressed by nonnuclear reconfiguration—such as detonator fabrication) have been sifted to the weapons laboratories.
- Reduced production needs and financial and public concerns have halted development of a new tritium production reactor
- Total defense funding has been significantly reduced.
- DOE defense-related funds are being stretched to cover the restructuring of the manufacturing complex; environmental restoration; waste management; and most operational environment, safety, and health concerns.

Between 1987 and 1996, RD&T funding in constant FY96 dollars at the national laboratories was reduced about 55%, and the funding for nuclear testing and supporting capabilities was reduced more than 50%. (The remaining nuclear test funds are for readiness to resume testing at the Nevada Test Site, if required.)

The nuclear weapons complex must make a transition to a new equilibrium that supports post-Cold War priorities and expectations and continues to assure the safety and reliability of the nation's nuclear stockpile. The national laboratories will, of necessity, play a key role in this transition and a vital one in the restructured complex.



Historical core RD&T funding in constant FY96 dollars, excluding funding for the Inertial Confinement Fusion (ICF) program, the Accelerated Strategic Computing Initiative (ASCI), and the Los Alamos Neutron Science Center (LANSCE)

Planning for the Future

Future National Security Responsibilities

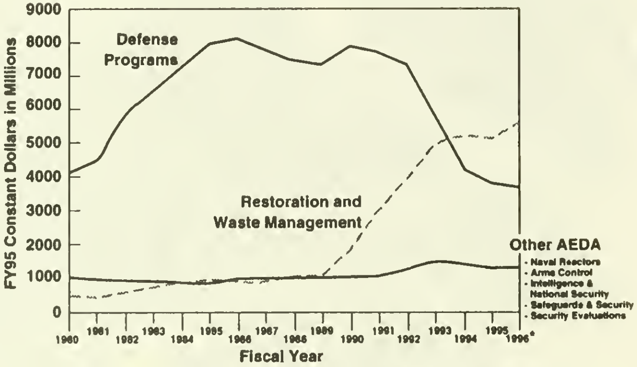
The vision for future (the year 2010) DOE Defense Programs is based on stewardship of a greatly reduced stockpile and includes the following assumptions:

- The ongoing nuclear force will be based on an active stockpile of 2500–5000 weapons and a reduced number of distinct weapon systems. Any weapons development programs will be driven by the need to ensure the safety and reliability of the stockpile (modifying or replacing weapons that, because of age, no longer meet acceptable safety and/or reliability standards).
- Emphasis within the nuclear weapons complex will shift permanently from large-scale production toward continued and improved management and control of nuclear materials and waste. DOE will continue to have fabrication capability but expects to need only a small capacity compared with its Cold War capacity.
- Research and development (R&D) will center on stockpile stewardship without nuclear testing and will provide (1) expert judgment about the safety, security, reliability, and vulnerability of U.S. weapons and (2) the ability to address stockpile problems related to aging.

The architecture of capability-based deterrence is applicable to a smaller stockpile and also provides the basis for reconstituting START I levels if that becomes a necessity.

Specific elements of the DOE Defense Programs' vision are as follows:

- Capability-based deterrence will be a principal DOE component in national defense strategy.
- DOE will maintain a smaller, more efficient nuclear weapons complex. More of the fabrication and surveillance capability will be located at the laboratory sites.
- DOE Defense Programs will take a dual-track approach to tritium production (see p. 24).
- Between now and 2010, a Defense Programs budget of approximately $4 0 billion/year for 10 years will be needed to support the stockpile stewardship program.



Funding History of atomic energy defense activities (AEDA)

* FY96 in current year dollars

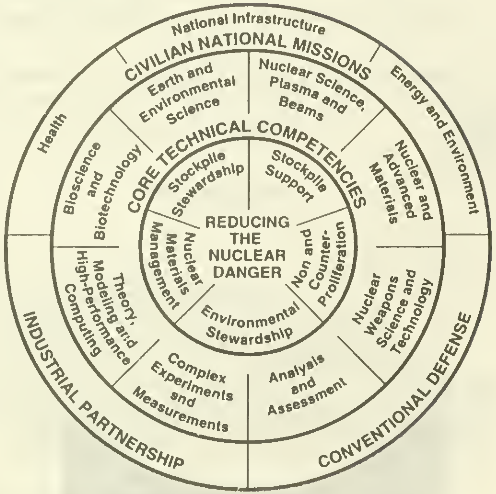
Los Alamos' National Security Role

DOE's post-Cold War responsibilities include

- stockpile stewardship and management (Defense Programs);
- nuclear emergency and proliferation response; and
- long-term management of nuclear materials, radioactive wastes, and retired sites.

These responsibilities, which currently constitute 70% of Los Alamos' programs, contribute to reducing the global nuclear danger and securing the nuclear future. This core of responsibilities forms the basis of our mission as we begin our second 50 years.

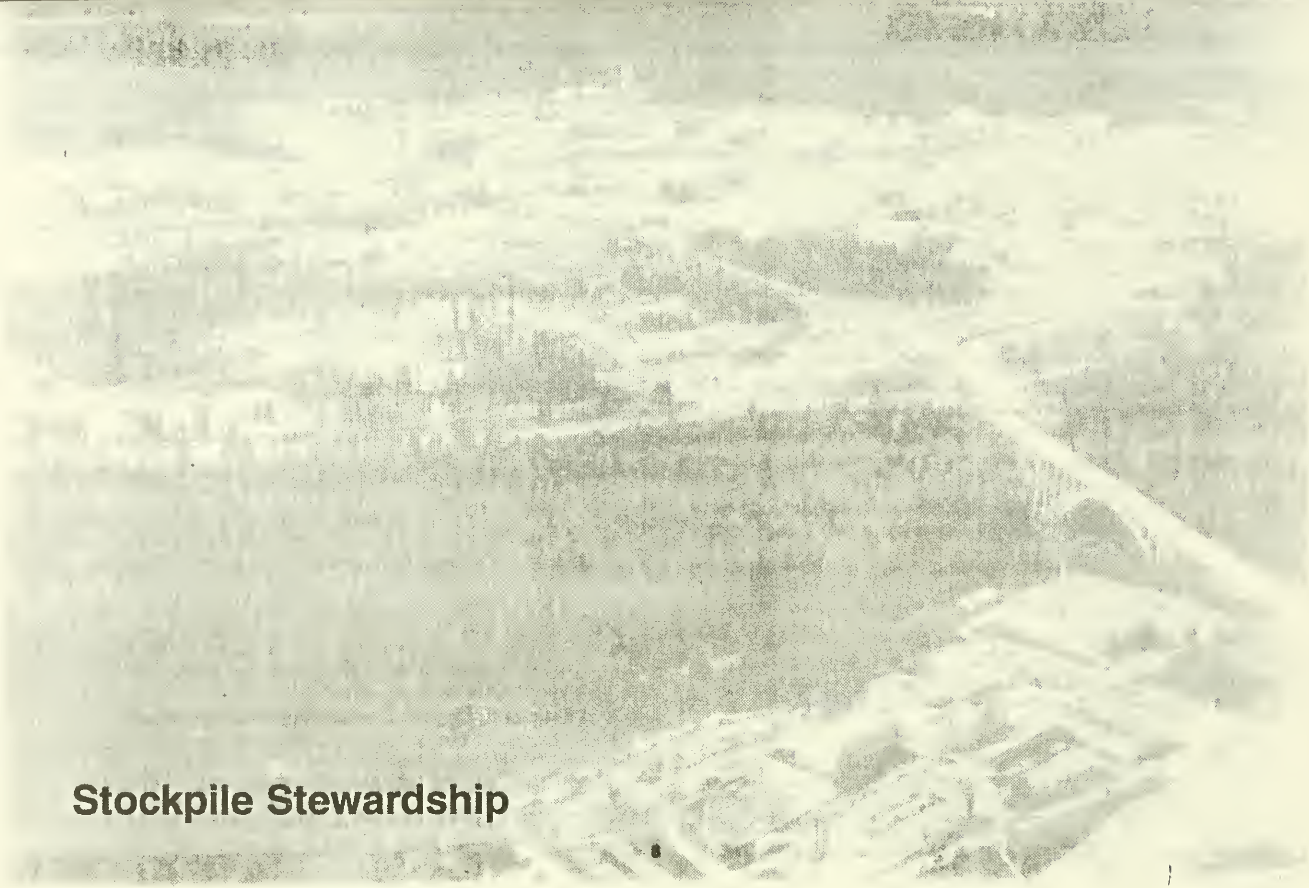
Los Alamos supports U.S. national security through its core mission: Reducing the Nuclear Danger.


National Infrastructure
CIVILIAN NATIONAL MISSIONS
Energy and Environment
Health
CONVENTIONAL DEFENSE
INDUSTRIAL PARTNERSHIP
CORE TECHNICAL COMPETENCIES
Earth and Environmental Science
Nuclear Science, Plasma and Beams
Nuclear and Advanced Materials
Nuclear Weapons Science and Technology
Analysis and Assessment
Complex Experiments and Measurements
Theory, Modeling and High-Performance Computing
Bioscience and Biotechnology
REDUCING THE NUCLEAR DANGER
Stockpile Stewardship
Stockpile Support
Non and Counter-Proliferation
Environmental Stewardship
Nuclear Materials Management

Reducing the Nuclear Danger

- Stockpile Stewardship
- Stockpile Management
- Nuclear Materials Management
- Nonproliferation/Counterproliferation
- Environmental Stewardship

Science is an integral part of the Laboratory's mission and competencies.



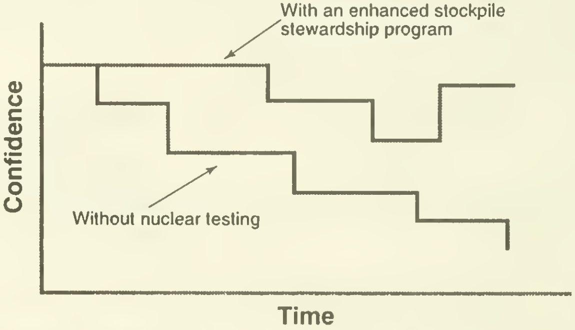
Stockpile Stewardship

Stockpile Stewardship: A National Commitment

The Challenge of Stockpile Stewardship without Nuclear Testing

Historically, confidence in the stockpile was maintained through both new development and nuclear testing, a combination that ensured stockpile quality and U.S. weapons expertise. New development provided weapons for new delivery systems and served to avoid or eliminate the effects of aging. Underground nuclear testing validated weapon performance.

Stewardship in the absence of nuclear testing will be a demanding scientific and technical challenge requiring a significant financial investment to ensure stockpile safety and reliability.



Confidence over time—Sustaining confidence in stockpile safety and performance without nuclear testing will require enhanced efforts.

Administration Support for Science-Based Stockpile Stewardship (SBSS)

The Presidential Decision Directive on Stockpile Stewardship (signed by President Clinton, November 1993) makes the following points:

- The objective is to maintain a high level of confidence in the safety, reliability, and performance of the U.S. nuclear stockpile in the absence of nuclear testing.
- The plan for meeting this objective will be structured around a strategy of using past nuclear test data in combination with (1) future nonnuclear test data and (2) aggressive application of computer modeling, experimental facilities, and simulators.
- DOE, DoD, and the Office of Management and Budget are directed to ensure that sufficient resources are devoted to meeting the objective.

On August 11, 1995, President Clinton codified SBSS as a condition of U.S. entry into a zero-yield comprehensive test-ban treaty (CTBT).

- *"I consider the maintenance of a safe and reliable nuclear stockpile to be a supreme national interest of the United States."*
- *"The nuclear weapons in the United States arsenal are safe and reliable, and I am determined our stockpile stewardship program will ensure they remain so in the absence of nuclear testing."*
- *"While I am optimistic that the stockpile stewardship program will be successful, as President I cannot dismiss the possibility, however unlikely, that the program will fall short of its objectives. Therefore, in addition to the new annual certification procedure for the nuclear weapons stockpile, I am also establishing concrete, specific safeguards that define the conditions under which the United States can enter into a CTBT."*
- One of the conditions for U.S. entry into a CTBT is *"conduct of a science-based stockpile stewardship program to ensure a high level of confidence in the safety and reliability of nuclear weapons in the nuclear stockpile, including the conduct of a broad range of effective and continuing experimental programs."*

On September 25, 1995, President Clinton directed that all three weapons laboratories are critical to SBSS and will be maintained.

Our Continuing Nuclear Responsibility

Los Alamos has always accepted full responsibility for its designs and products throughout their stockpile life. This responsibility includes every facet of design, development, production oversight, and stockpile deployment and retirement. Nothing is delegated except custody.

Los Alamos Systems: A Significant Part of the START II Stockpile

Missiles	
— SLBMs	W88 (Trident II)
	W76 (Trident II)
— ICBMs	W78 (MM III)
	W87(Peacekeeper/MM III)
Air Carried	
— Bombs	B61-3, -4, -10
	B61-7
	B61-11 (to replace B53)
	B83
— Cruise Missiles	W80 (ALCM, SLCM, ACM)

Los Alamos' Approach to Stewardship

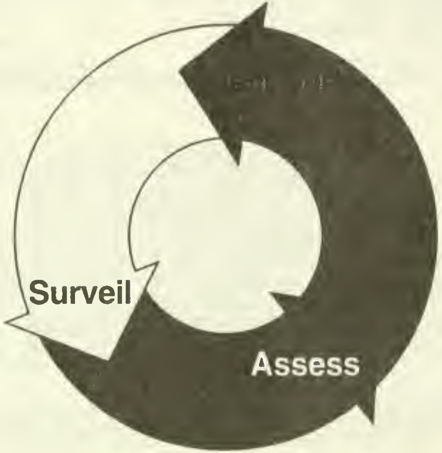
Our approach to stewardship is part of a DOE program to move away from nuclear-test-based certification of nuclear weapons reliability and safety and replacement-based assurance of weapon performance. The move is to a program of certification and assurance based on thorough surveillance, scientific understanding, and predictive models of performance. This science-based approach is essential to meeting the challenge of accurately evaluating and correctly responding to the effects of stockpile aging.

Once in place, this approach will permit us to evaluate specific situations and select appropriate responses: requalifying a weapon for the enduring stockpile; removing a weapon system from the stockpile; remanufacturing a replacement weapon; or remanufacturing an existing weapon with modifications that will extend its lifetime, correct a problem, or substitute safer or more-reliable components. To do this we must have an in-depth understanding of nuclear weapons, based on fully researched and documented scientific knowledge.

Strategy for Certification and Assurance

Los Alamos will pursue certification and assurance through three interconnected areas of activity:

- Science-based enhanced surveillance will allow us to diagnose and predict age-related phenomena in stockpile weapons.
- Assessment will advance our understanding of how aging and manufacturing processes affect weapon performance.
- Response will take the form of repair and/or remanufacture and revalidation of stockpile weapons.



Our Continuing Nuclear Responsibility (cont.)

Pillars of the Stewardship Program

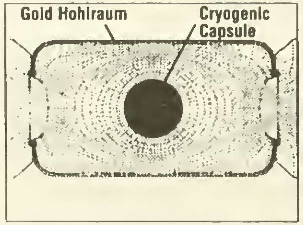
Los Alamos has defined six "Pillars of the Program" to support achievement of stewardship program goals.

1. Stockpile Performance: Ensure that stockpile warheads will work as certified.

Nondestructive dynamic test

Nonnuclear detonation test

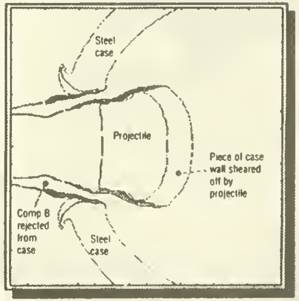
2. Weapons Science: Develop a fundamental understanding in the absence of underground testing.



National Ignition Facility (NIF) target calculation

Predictive capabilities benchmark codes' engineering perturbations

3. Surety Assessments: Assure stockpile surety over the complete weapons cycle, from the Laboratory to the stockpile and back.


Steel case
Projectile
Piece of case wall sheared off by projectile
Comp B rejected from case
Steel case

Initiation by penetrating fragments

Warhead response to combined abnormal environment

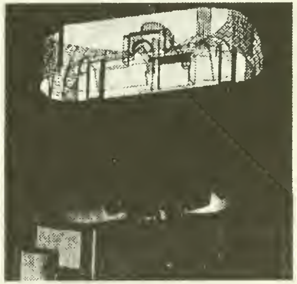
4. Response to Post-Cold War Uncertainties: Assess future contingencies and provide for national response options.

Above: Nevada Test Site—Readiness to resume underground testing

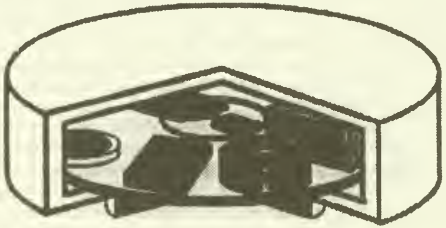
Right: Estimate of a radiation from strike on a nuclear facility—Nuclear emergency response is part of stewardship.

5. Enduring Stockpile Options: Demonstrate future technology options for the maintenance, surety, and improvement of retained stockpile systems.

Fire-resistant pit coupon tests to assess technology developments and applications

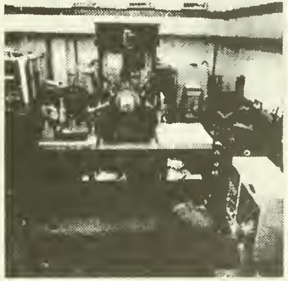


A rapid prototyping technology (laser sintering) that uses a laser to form a prototypical solid part

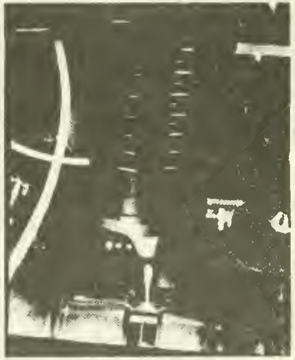


Highly integrated detonation system (HIDS)—An advanced technology in detonation systems

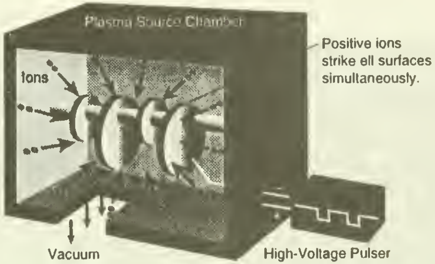
6. Materials and Integrated Manufacturing: Develop and provide technologies and capabilities for creating parts, materials, and components for the stockpile and for R&D.



Rapid prototyping of components



Laser welding—A process that results in reduced waste



Plasma source ion implantation to improve component longevity—Developed in part through an industrial partnership supported by the weapons program

Managing an Aging Stockpile

Confidence over Time

Maintaining confidence in the stockpile means ensuring that stockpile weapons are safe and secure and will function as designed. Many issues of concern are associated with material changes that occur over time. These issues become much more important as the stockpile becomes smaller and less diverse. (A less-diverse stockpile is more susceptible to common-mode failures.)

The effects of aging, which are not always gradual, can lead to significant concerns about the proper functioning of a weapon system. Complications arise from the complexity of the physical phenomena that take place in a nuclear weapon: explosion, implosion, material mixing, radiation transport, thermonuclear ignition and burn, and so forth. In the past, a number of issues have arisen that were significant enough to require modification of a weapon's physics package. In many of these cases, nuclear testing was a key tool for validating the modification.

Stockpile Issues Associated with Aging

As stockpile weapons age, a number of physical changes take place:

- Organic, high-explosives components degrade.
- Cracks or voids develop in components.
- Plutonium ages, with a concomitant buildup of impurities.
- Creep and subsequent dimensional changes occur.

Deterioration of high explosives, new (left) and aged (right)

Identical remanufacture will become more difficult over time because of changing circumstances:

- Some of the manufacturing process lines used for original production have, or will be, disassembled.
- Commercial practices and materials used in weapon components will become obsolete.
- Some process changes will be driven by environmental regulations.
- The "completeness" of specifications for manufacturing and material processes important to component performance may be difficult to ensure.

In summary, both aging and remanufacture can bring about changes in material properties and in the dynamic behavior of weapons. Therefore, we must evaluate the effects of aging on weapon safety and reliability, and we must be able to evaluate and recertify the safety, performance, and reliability of any remanufactured weapon.

Enhanced Surveillance and Requalification

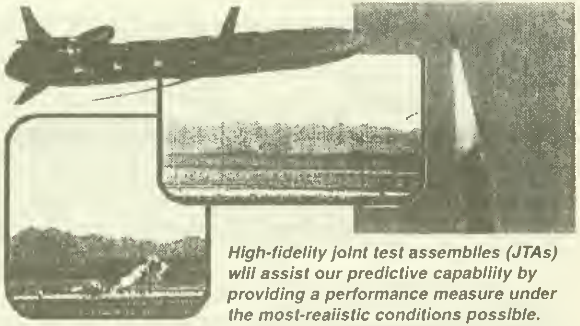
We will continue a regular program for annually withdrawing a small number of stockpile units for inspection. Nonetheless, stockpile-focused, science-based stewardship calls for a new and more integrated relationship between science, computational simulation, and surveillance. Enhanced surveillance will integrate science and surveillance, allowing us to diagnose and predict age-related phenomena in stockpile weapons. For example, we expect to submit components of an occasional primary to a stockpile-confidence hydrodynamic test or a high-fidelity flight/environmental test. As a unit approaches its scheduled end-of-life, we will put it through screening diagnostics to requalify it for reuse or redeployment. These tests will include visual and radiographic inspection and also ultrasonic detection of potential mechanical defects in assemblies and subassemblies, x-ray CAT scans, fiber-optic microscopy, and neutron radiography.

Nondestructive Evaluation and Testing Technologies for Enhanced Surveillance

Examples of these technologies include

- resonant dynamic inertial spectroscopy, which detects broken or damaged bonds and degraded mechanical attachments;
- resonant ultrasound spectroscopy, which detects material property changes and part or assembly defects;
- Bayesian tomography, which provides the foundation for quantifying uncertainty in the shapes of objects and evaluating densities; and
- neutron radiography and scientific experiments in materials science and characterization associated with aging-related phenomena.

Together, science-based stockpile stewardship and stockpile management will link science, materials, manufacturing, and the surveillance of stockpile weapons to assure the safety, security, and reliability of our deterrent.

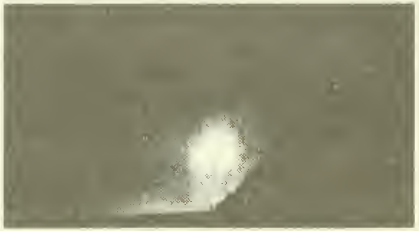


High-fidelity joint test assemblies (JTAs) will assist our predictive capability by providing a performance measure under the most-realistic conditions possible.

Hydrodynamic Tests for Enhanced Surveillance

Hydrodynamic testing provides us with a means for assessing and forecasting nuclear performance, nuclear package reliability, and confidence levels in the absence of underground testing. Hydrodynamic tests allow us to

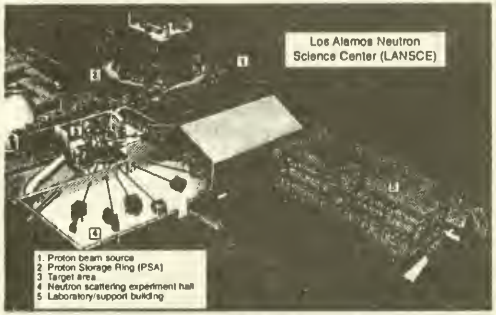
- benchmark zero-life warheads, using modern diagnostics;
- provide data on aged warheads; and
- calibrate models to actual performance.



Neutron Radiography, Neutron Scattering, and Materials Science

The Los Alamos Neutron Science Center (LANSCE), provides a valuable vehicle for a large number of scientific experiments in materials science research. For weapons stewardship, LANSCE, through neutron scattering and radiography, can address a wide variety of materials issues including aspects of high-explosives burn, shocks, aging-related phenomena, and a material's equation of state and can also measure nuclear cross sections. Neutron radiography can allow nondestructive measurement of structural changes internal to weapon components.

LANSCE has been the principal facility used as a test bed for the technical issues validating the concept of accelerator production of tritium (see p. 24).


Los Alamos Neutron Science Center (LANSCE)
1
2
3
4
5
1. Proton beam source
2 Proton Storage Ring (PSA)
3 Target area
4 Neutron scattering experiment hall
5 Laboratory/support building

Los Alamos Neutron Science Center (LANSCE)

***Left:* Contents of sealed 15th-century Indian pot revealed using neutron radiography**

***Right:* Defect in cement-filled waste drum identified using computed tomography**

Accessing and Comparing Data from Yesterday, Today, and Tomorrow

The Value of Data Reanalysis, Documentation, and Archiving

By reanalyzing, documenting, and archiving previously recorded nuclear weapons data, we can provide essential baselines for the performance of the enduring stockpile:

- Five decades of nuclear test data will provide the "ground truth" for nuclear weapons modeling and analysis.
- Reanalysis of this data will provide a starting point for questions that arise about the aging stockpile. Reanalysis includes new calculations and experiments using the best techniques available.
- Documentation and archiving will enable us to have continued access to necessary expertise and knowledge.

Archiving at Los Alamos

The Los Alamos archival project will focus on providing data for nuclear weapons analysis:

- Teams have responsibility for analyzing a stockpile system and for carrying out related nonnuclear design experiments.
- The archival project will be a principal mechanism for training the next generation of designers, engineers, and diagnosticians.
- Our archiving activities will establish a baseline for analyzing the performance, safety, and reliability of the aging stockpile and recertifying, extending lifetimes, and developing modifications.
- Archiving activities include collaboration with other DOE weapons complex organizations, the DoD and Defense Nuclear Agency (DoD/DNA), and the United Kingdom (especially for coordinating data structure, descriptions, retrieval, and security).
- FY96 archiving activities will be focused first on the W76 (SLBM) dual revalidation and the W87 lifetime extension and then, if resources permit, on the B61 (bomb).

Experimental Programs

Archiving past test data is not enough for evaluation and assessment; an aggressive experimental program is essential for this purpose and for maintaining nuclear design competence, a basis of effective stewardship. Without nuclear testing, we will emphasize more-predictive calculational capabilities and experiments tied directly to past nuclear data and/or to the physics underpinning weapons performance and safety. In addition, we will rely on our cumulative technical know-how to make valid inferences for physics regimes that are inaccessible with current experimental methods.

Experiments provide a test of reality against which we must benchmark the calculations and the expert judgment on which assurances of weapon safety, reliability, and performance must rest. They also provide fundamental data to develop improved scientific understanding. In an experimental program, weapons community experts predict the outcome of experiments, engineer test hardware, and analyze results with extrapolation to real weapon conditions. In sum, experimental programs integrate the practical aspects of weapon performance and, therefore, support continued weapons expertise as well as stockpile assessment. An appropriate suite of complementary experimental capabilities will be needed because not all of the physics aspects of a nuclear explosion can be produced simultaneously without an underground test.

Hydrodynamic Testing

Hydrodynamic tests—high-explosives-driven experiments for studying primary implosions—constitute the most important aboveground, nonnuclear testing capability because they address the most important issues in stockpile reliability: the functionality and safety of the primary stage.

The principal diagnostic tool for hydrodynamic testing is high-resolution, dynamic radiography (x-rays). The best hydrodynamic testing facilities currently available are Los Alamos' Pulsed High-Energy Radiographic Machine Emitting X-Rays (PHERMEX) and Lawrence Livermore's Flash X-Ray (FXR) Facility.

When it is completed, Los Alamos' Dual-Axis Radiographic Hydrotest Facility (DARHT) will provide major improvements needed for stockpile evaluation and assessment. DOE has completed its environmental impact statement (EIS) and record of decision (ROD). Construction on DARHT is expected to resume in 1996 but will not resume until a current court injunction is lifted. This action is currently being pursued by DOE and the Department of Justice.

Pulsed High-Energy Radiographic Machine Emitting X-Rays (PHERMEX)

Dual-Axis Radiographic Hydrotest Facility (DARHT)—artist's conception

Benefits of DARHT

Designed as a multidiagnostic national user facility for evaluating nuclear weapons, DARHT will feature

- significantly improved x-ray resolution and penetrating power;
- time sequencing, spatial separation, and stereo-view capability;
- contained or open-air testing capability (phased implementation of containment); and
- complete electronic and optical data-acquisition systems.

Experimental Programs (cont.)

Subcritical Experiments at the Nevada Test Site

In the absence of underground nuclear testing, we need improved knowledge of the dynamic properties of nuclear materials to assess the effects of aging or new manufacturing techniques on weapon performance. Subcritical experiments at the Nevada Test Site will help address these concerns. These experiments will include nuclear materials such as plutonium but will be designed not to produce self-sustaining nuclear reactions, and are therefore consistent with a zero-yield CTBT. The category of experiments is termed "subcritical." These experiments complement dynamic experiments that will be conducted at other facilities.

Strategy for Hydrodynamic Testing and Other Experiments

Our plan is to gather baseline hydrodynamic test data on all stockpile weapon primaries, along with necessary experimental data from additional sources (including subcritical experiments, LANSCE, and others) to support stockpile evaluations. In our experimental program we will include

- experimentation to supply data for our 3-D safety code validation,
- investigation of fundamental physics issues related to weapon primaries and weapon aging,
- render-safe experimentation to address possible proliferant or terrorist nuclear devices,
- testing of several potential safety improvements as prototypes, and
- contributions to the recertification/revalidation process.

High-Energy-Density Physics Regimes

Nuclear explosives achieve higher temperatures and pressures than any other objects in our solar system. Under these conditions atoms are almost completely ionized, and neutron radiation is so intense that higher-order nuclear processes become common.

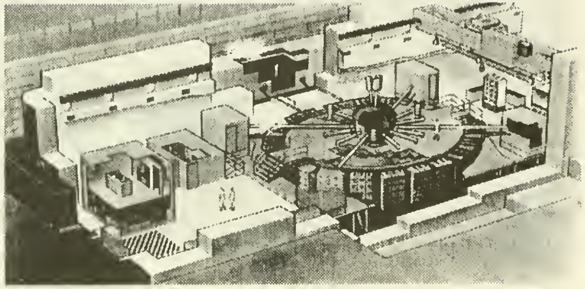
Our knowledge of such extreme conditions has been gained through theoretical calculations and nuclear tests. Without underground nuclear tests, we have an urgent need to develop laboratory experiments that simulate the conditions of nuclear explosions. Such techniques are needed to provide us with (1) more-accurate information on physical processes involving matter at high-energy density and (2) the means to continue developing the special skills for maintaining an understanding of nuclear weapons.

Two different approaches to addressing high-energy-density problems—Atlas and the Inertial Confinement Fusion (ICF) program—employ pulsed power or high-energy lasers to provide the extreme conditions for weapons physics experiments.

Atlas

With pulsed-power facilities such as Atlas, we can better understand the physics of nuclear weapon primaries and secondaries. Atlas will provide a way for us to carry out large-scale hydrodynamic experiments at high enough pressures and temperatures to ionize materials. The facility will allow us to model and study implosion hydrodynamics and material properties on a realistic, readily diagnosable scale to evaluate the effects of aging and corrosion that may occur in the stockpile.

DOE has funded Atlas, beginning in FY96. Preliminary design is under way.



Atlas pulsed-power facility—artist's conception

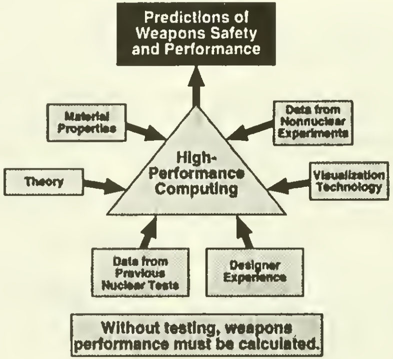
Inertial Confinement Fusion (ICF)

Los Alamos plays a major role in the national ICF program. By placing our main emphasis on target physics, we are resolving critical issues associated with demonstrating the feasibility of ignition. We are also enhancing stewardship by directly involving core weapons personnel and measuring basic phenomena in weapons physics. We pioneered integrated calculations of indirect drive, and these have been essential in explaining x-ray temperature and capsule symmetry. Our experiments at Los Alamos, Livermore, Rochester, and the United Kingdom's facility have assured a safe margin in driving targets without major losses to plasma phenomena.

The Role of Numerical Computation

Weapons Computing and the Accelerated Strategic Computing Initiative (ASCI)

Computers have played a fundamental role in the design and analysis of nuclear weapons since the Manhattan Project. Assuring the safety and reliability of weapons in an aging stockpile without testing requires much greater computing capability. DOE's ASCI initiative will drive advanced 3-D code development and aggressively exploit advances in computing technologies. Computing hardware initiatives planned for ASCI will be in partnership with U.S. companies.


Predictions of Weapons Safety and Performance
Material Properties
Data from Nonnuclear Experiments
Theory
High-Performance Computing
Visualization Technology
Data from Previous Nuclear Tests
Designer Experience
Without testing, weapons performance must be calculated.

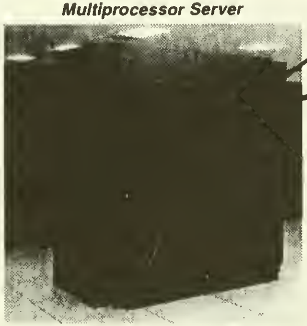
High-Performance Computing:
The Integrating Factor in Stockpile Stewardship

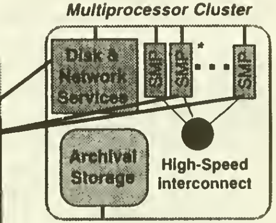
Software advances required for weapons simulations include

- 3-D codes for modeling the behavior of full weapon systems,
- algorithms for parallel computing, and
- unified design/aboveground testing capability for weapon behavior experiments.

The 3-D safety and performance calculations for weapons demand significantly increased computing power, as represented by

- scalable computing (for example, massively parallel processors) for 100- to 1000-fold improvement in capability;
- clusters of commodity multiprocessors to provide cost-effective capacity;
- 100-fold improvement in archival storage technology (to be developed through collaboration with industry);
- high-speed, secure networks to move massive amounts of data; and
- software infrastructure for computing effectiveness.





Clustered multiprocessors deliver teraFLOPS computing.

** SMP = shared-memory multiprocessor*

Refurbishment and Prototyping

Although new production of nonnuclear and nuclear components and assemblies will be rare under capability-based deterrence, the need to refurbish the stockpile is inevitable. We must be able to guarantee the safety and performance of replacements, and we must maintain the ability to manufacture them in a consolidated production complex.

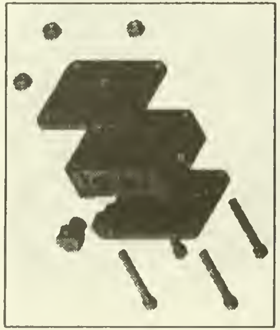
We also anticipate the need for improvements that will enhance safety and security. Such improvements will be introduced through a "graded" approach, paced by need and affordability.

Refurbishment and Prototyping of Nuclear Weapons

In the post-Cold War context, refurbishment and prototyping of nonnuclear and nuclear components and assemblies are important because those activities allow for

- maintaining technologies to support current defense strategy, including preserving capabilities as a hedge against an uncertain future and making reconstitution of capacity possible if required;
- exercising the intellectual and physical base that ensures the ability to realize weapons, including providing a credible demonstration that capability exists and responding quickly to changing requirements and constraints; and
- keeping the linkage of DoD and DOE infrastructures relevant, including ensuring that projects reflect stockpile priorities and producing useful products through system-level studies.

Computer-Aided Design and Manufacturing Technology



Benefits:

- Solid modeling and stereolithography
- Manufacturability assessment
- Design documentation to ANSI and DOE standards (geometric dimensioning and tolerancing)
- Communications and open information sharing
- Numerical control programming and postprocessing (high explosives a specialty)
- Reproduction, distribution, and archiving of drawings

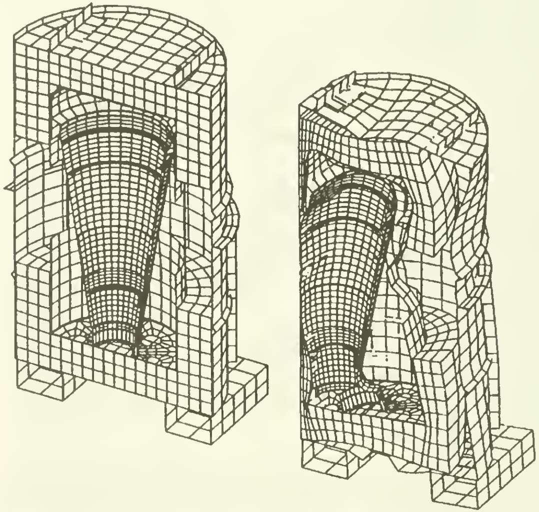
Computer-Aided Engineering Technology

Benefits:

- Product realization
- Mass properties calculation
- Quality function deployment
- Rapid prototyping of nonnuclear and nuclear components and assemblies
- Design for manufacturing and assembly
- Project scheduling and tracking

Stockpile Surety: Assessment and Remediation

The retirement of older weapons has increased the overall surety (safety, security, and control) of the U.S. nuclear weapons stockpile. At the same time, the DOE/DoD community has expanded and tightened the criteria for weapons surety. We are pursuing an aggressive surety assessment program, with calculational modeling and experiments, to develop an understanding of how surety-related insults affect stockpile weapons. This effort in turn leads to a remediation program through which we can improve weapons surety when refurbishment or component replacement is required.



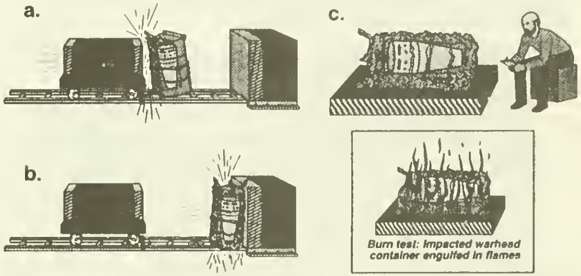
Simulation showing how impact onto a rigid surface affects a warhead packed inside a shipping container

Assessment

- Joint DOE/DoD studies are
  - evaluating accident scenarios, along with resulting credible abnormal environments and credible combinations of abnormal environments;
  - evaluating weapon response;
  - quantifying risks; and
  - identifying goals for improvements.
- Assessments provide the impetus for developing improved models and data to better represent how a warhead will be affected by potential storage, transport, and operating environments.
- Hydrotests and other experiments generate the data required for assessment models.

Remediation

- Assessments identify component technologies in which risk factors can be mitigated in areas such as the detonation system, the primary, and use-control systems.
- For each component system, generic technologies are being developed to take advantage of potential windows of opportunity to upgrade stockpile surety.
- Cost benefit assessments will be conducted to determine when or if a specific technology should be implemented in a given warhead.


a.
b.
c.
Burn test: Impacted warhead container engulfed in flames

Impact/crush test: (a) Sled impacting warhead container and (b) driving it into barrier, followed by (c) study of the impacted warhead container

Materials and Integrated Manufacturing in the Restructured Nuclear Weapons Complex

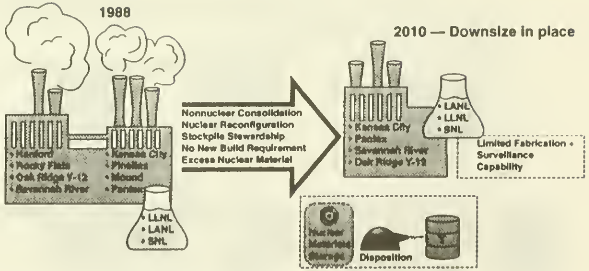
Now that the Cold War is over, the nuclear weapons complex will be consolidated and restructured to reduce costs and reflect new goals: stockpile maintenance, environmental restoration, and waste management. To meet these new goals, we must maintain active competence in people and confidence in equipment. We can do that best by continuing to integrate design, materials, and experimental capabilities at a common location.

The restructured complex is likely to be a radical departure from the complex of the past. In fact, many facilities that have been part of the complex will have no direct counterparts, and the associated manufacturing technologies will be modified significantly to incorporate modern processes and practices. Nonetheless, with proper support, a downsized and cleaner complex will meet stockpile management needs, such as

- fabrication capability for a modest number of new warheads;
- refurbishment and requalification capability for stockpile warheads (an estimated 50–150 units a year); and
- safe storage of plutonium and enriched uranium as dismantled weapons components or in other forms, including the processing of dismantled material.

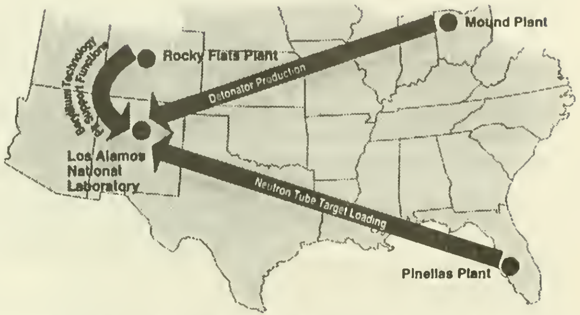
Modern manufacturing and process technology will be developed at the laboratories to minimize waste and worker exposure and to resolve environmental and safety concerns. The national laboratories will fabricate some components and the few weapon prototypes necessary to support the nation's R&D program, thus allowing the nation to maintain both its R&D capabilities and an essential backup processing and fabrication capability. Los Alamos has been identified as DOE's preferred alternative for manufacturing plutonium pits.

Although we expect no new production of plutonium or highly enriched uranium, the restructured complex will eventually include a new tritium production capability to replace past reactors. In addition, the nation will continue to move toward a strategy that satisfactorily manages long-lived radioactive wastes from defense and other sources.



LANL	Los Alamos National Laboratory
LLNL	Lawrence Livermore National Laboratory
SNL	Sandia National Laboratories

The Los Alamos role includes stewardship of the technology and a limited capacity for fabrication, surveillance, and remanufacturing.



Los Alamos has been given responsibility for technology stewardship of some nonnuclear components.

Los Alamos Capabilities

Los Alamos National Laboratory provides many one-of-a-kind facilities and capabilities for the U.S. Nuclear Weapons Program. Some of those facilities are shown here.

1. Weapons Engineering Tritium Facility (WETF)
- Repackaging of tritium
- Chemical purification of tritium
- Mixing and analyzing of gas mixtures
- Reclamation of tritium
- Applied tritium R&D for boost systems

2. Sigma Complex (metallurgical and ceramics activities)
- Foundry
- Near-net-shape modeling and casting
- Electroplating
- Welding/joining
- Powder, rapid solidification, and deformation processing
- Coating and plasma spraying

3. Chemistry Metallurgy Research (CMR) Building
- Analytical chemistry
- Plutonium metallurgy
- Uranium chemistry
- Support functions

4. Los Alamos Neutron Science Center (LANSCE)
- Neutron scattering and radiography
- Spallation neutron technology
- Nuclear data
- Radioisotope production

5. High-Explosives (HE) Facility
- HE casting
- HE pressing
- HE machining
- HE R&D
- Detonator production
- Sufficient capacity for replacing HE in all enduring stockpile types

6. Plutonium Facility
- Plutonium processing, characterization, and fabrication
- Pit surveillance
- Plutonium metallurgy, accountability, and control
- Actinide material chemistry
- Nuclear fuels development

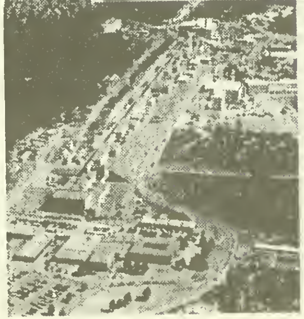
1.

2.

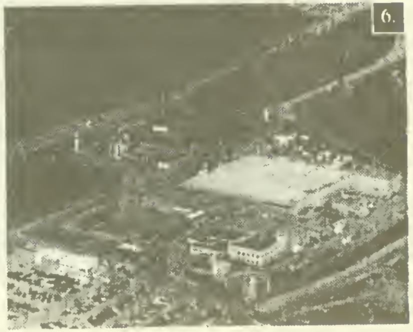
3.

5.

4.



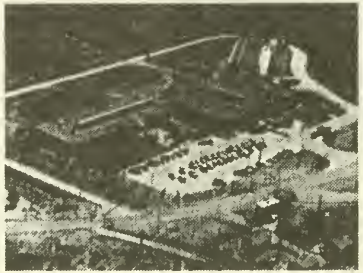
6.



Los Alamos Capabilities (cont.)

Los Alamos also provides manufacturing, backup manufacturing, beryllium technology development, and process development capabilities for many nuclear components.

Pit support (surveillance) and manufacturing at the Plutonium Facility



Detonator R&D and manufacturing

Ring rotocon—gauging tool for inspecting hemispherical shapes

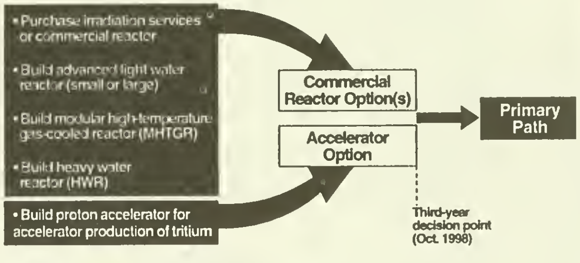
High-explosives machining

21st Century Production of Tritium

21st Century Needs

Tritium, a gas with a 12.3-year radioactive half-life, is used in all U.S. nuclear weapons to increase the explosive force of the warhead. Nonetheless, the United States has no tritium production source. Although the national intention is to achieve the lower number of weapons specified in START II, the capacity and startup date for tritium production are programmed to be sufficient for START I.

The tritium production strategy adopted by DOE is to pursue a "dual-track" technology path—investigation of reactor and accelerator options—to ensure an adequate tritium supply. The accelerator production part of this strategy will involve demonstrations of technology and design of a plant.


• Purchase irradiation services or commercial reactor
• Build advanced light water reactor (small or large)
• Build modular high-temperature gas-cooled reactor (MHTGR)
• Build heavy water reactor (HWR)
• Build proton accelerator for accelerator production of tritium
Commercial Reactor Option(s)
Accelerator Option
Primary Path
Third-year decision point (Oct. 1998)

Dual-track strategy for tritium production

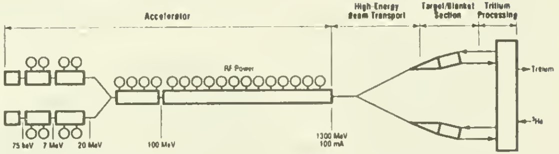
Accelerator Production of Tritium (APT)

APT, one tritium production option being examined by DOE, makes use of a linear accelerator to produce a very-high-energy proton beam directed to a lead or tungsten "target." In this option, no fissile materials are needed. When the beam strikes the target, neutrons are released in a process called spallation. Helium-3 gas captures the neutrons to make tritium.

The scientific basis for APT is sound, and most of the technology is currently available, but some engineering issues need to be addressed. These issues include reliability, maintenance cost, and component lifetimes.

Accelerator Upgrade Path Enables Phased APT Plant

1. Construct and operate 40-MeV, continuous-wave APT front end at full current (100 mA).
2. Demonstrate tritium production efficiency at low power using full-scale target/blanket.
3. Demonstrate critical target/blanket components at full power density.



mA	milliampere
MeV	megaelectronvolt

The APT concept offers several advantages, including
- minimal environmental impact (minimum potential for significant tritium release to the environment),
- no high-level radioactive waste or spent nuclear fuel,
- increased safety and health margins (no fissile materials used),
- early realization of production capability,
- relatively low construction and operating costs, and
- complete separation of military and commercial facilities (no nonproliferation issues).

Los Alamos pioneered the APT concept, which is being implemented in a program that partners Los Alamos with an industrial team.

Confidence in the Stockpile

Reviewing the Warranty: The Basis of Confidence

It is impossible to accurately foresee technical problems that may arise within the U.S. stockpile or to predict the nature of future scientific breakthroughs. Future stockpile problems could necessitate the retrofitting or replacing of entire weapon systems, and future scientific breakthroughs could make possible new threats to U.S. security. Our ability to analyze possibilities and respond appropriately is essential. This rests on our past nuclear test data along with our present and future stewardship program.

Certification

Certification is the formal process by which a cognizant agency confirms that a warhead or component design conforms to its required military characteristics, with exceptions noted. Historically, certification has been associated with the introduction of new warheads to the stockpile. No new or substantially modified nuclear weapons have entered the stockpile since the end of U.S. nuclear testing in September 1992, and no production of new-design weapons is planned. Nonetheless, several modifications to existing weapons are planned for the near future, and these modifications will require some form of certification before they are deployed. In addition, future replacements to nonnuclear components generally will employ modified designs. DOE's existing certification process, with its peer review agreements, will provide a framework for these actions.

Revalidation

During FY95 a joint DoD/DOE working team developed a proposal for dual revalidation of the nuclear weapons stockpile. Dual revalidation is intended to provide a new, robust form of peer review for individual weapon types. The DoD, through the Project Officers Group framework, will play an integral role.

Such a formal and robust peer review process is an important response to the cessation of nuclear testing. It does not replace certification or form a new certification process but formalizes a process that could provide information for a potential certification. It is principally intended for periodic revalidation of stockpile weapons on a schedule that has not yet been developed but will probably take 2–3 years per system, with overlap to make the whole cycle more time-compressed. The revalidation process will provide a baseline assessment (derived without nuclear testing) of the stockpile's health and identify, as much as possible, the limits to component life.

Preserving the Skill Base

A strong knowledge base will be vital throughout the life of the nuclear stockpile. However, most of the people with practical nuclear weapons experience will retire in the next 10 years or so; their know-how must be passed to the next generation of stockpile stewards.

This unique knowledge base must also be enhanced and extended. Research into new areas of physics, materials science, engineering, computations, and so on, is essential if we are to stay at the forefront of science and technology and protect ourselves from adverse technological surprises. Additionally, the nation cannot risk a nuclear accident because of inattention or the loss of crucial know-how.

Preserving Capability

Manufacturing capacity can be greatly reduced and is somewhat tied to stockpile numbers. Capability, however, is tied to the scientific and technological challenges of stewardship, and those challenges do not simply scale with the number of weapons in the stockpile.

A large number of specialized skills are required for evaluating and responding to weapons issues, whether the stockpile contains 3000 or 300 weapons. Stewardship involves highly diverse tasks, such as

- addressing stockpile issues and certifying their resolution,
- supporting assessments of proliferation and military threats,
- ensuring safe dismantlement,
- providing adequate capability for refurbishment and replacement, and
- ensuring credible capability for reconstitution.

> *"Of the elements of stewardship described in this report, the skill base is the one in greatest jeopardy. . . . Gaps in the skill base are opening, with adverse implications for stewardship. Preserving the skill base is, therefore, an immediate problem."*
>
> Congressional Research Service
> May 1994 Report

Other Nuclear Weapons Program Activities

Addressing Environmental Issues

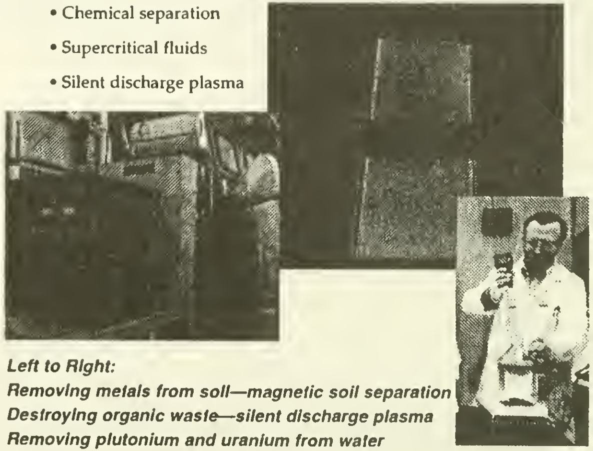
Securing the nuclear future and responding to ongoing public concerns about nuclear waste and related issues will involve developing new technologies for cleaning up the legacy of almost 50 years of plutonium production, reactor residue, and nuclear weapons production.

Cleaning Up the Legacy of 50 Years

The key to solving environmental problems in a quick, inexpensive, and effective way is to develop innovative partnerships between government agencies, universities, and industry. Successful integration eliminates the duplication of effort that contributes to delays, incompatibility with other innovations, and wasted funds.

To solve specific cleanup problems, Los Alamos has developed research plans and industrial collaborations in the technology areas listed below.

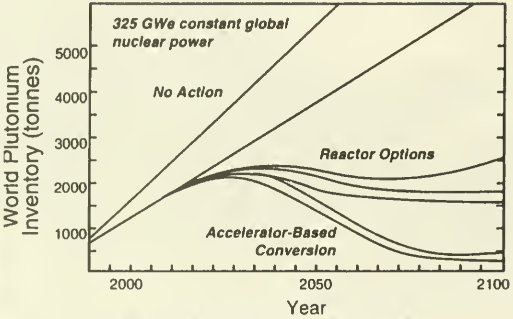
- Magnetic separation of metallic species
- Chemical separation
- Supercritical fluids
- Silent discharge plasma



Left to Right:
Removing metals from soil—magnetic soil separation
Destroying organic waste—silent discharge plasma
Removing plutonium and uranium from water

A major problem facing the United States and Russia is handling surplus plutonium until final disposition can be accomplished:

- One step is transition to storage, where plutonium is secured and converted to a stable metal or oxide. Both interim storage and long-term storage (more than 50 years) are under consideration.
- Disposition options include burial in a geologic repository and destruction through fission in accelerator-based conversion or in "deep-burn" advanced reactors.



Impact of disposition options on global plutonium inventories

As a leader in nuclear cleanup and renewal, Los Alamos is addressing environmental remediation by adapting accelerators for transmutation of unwanted isotopes, which offers advantages that include

- transmutation of commercial nuclear waste for management without geologic storage;
- destruction of weapons plutonium from stockpile reduction and cleanup of plutonium production sites;
- elimination of plutonium from the civilian nuclear fuel cycle; and
- production of "unlimited" and safe nuclear energy without long-term, high-level waste.

Russian-American Collaboration: Transition to Peacetime Work

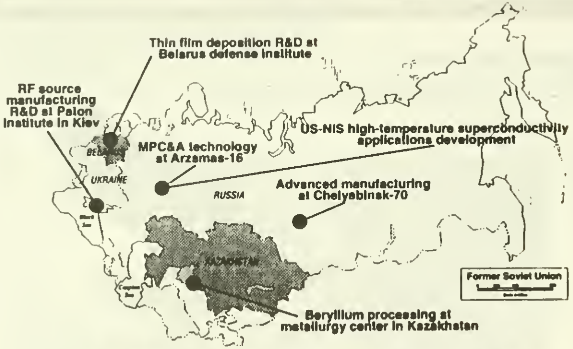
In the aftermath of the Cold War, Russian and American nuclear weapons laboratories share a common purpose: responsible nuclear stockpile stewardship, technical support for agreed-upon stockpile reductions, and conversion to peaceful applications of the scientific and technological expertise developed within their nuclear weapons programs. Scientific conversion, a concept developed at Los Alamos in 1993, engages core nuclear weapons scientists and engineers in basic scientific activities, reintegrating them into the international scientific community. Through scientific conversion hundreds of former weapons specialists have found new, non-weapons-related work.

The initial collaborations between Russian and American nuclear weapons scientists were developed during a June 1992 Los Alamos visit to Arzamas-16 and came to fruition on September 22, 1993, when the first joint Russian-American scientific experiment involving nuclear weapons centers was conducted at a location formerly used for developing Soviet nuclear weapons. Since then, collaborations have expanded to encompass a wide range of technical topics and have moved international cooperation between Russian and American scientists from the extraordinary to the ordinary.

At Los Alamos, the Center for International Security Affairs (CISA) coordinates these collaborative efforts, the largest of which is nuclear material protection, control, and accountability (MPC&A). As the lead laboratory in this effort, Los Alamos works with other U.S. laboratories and with our Russian counterparts. Progress has been rapid, with new Russian facilities continually joining the program.

Another initiative, the Industrial Partnering Program, uses U.S. national laboratory expertise to assist the commercial development of promising technologies in the former Soviet Union's newly independent states (NIS): Russia, Belarus, Kazakhstan, and Ukraine. In other areas, Los Alamos technically assists DoD's Cooperative Threat Reduction Program by providing accident response equipment and support for the design and safety analysis of the Russian fissile material storage facility that will receive nuclear materials from dismantled warheads. Los Alamos is also a key participant in an intergovernmental agreement that brings together U.S. and Russian experts in a series of exchanges on nuclear warhead safety and security.

In these and other ways, Los Alamos is a leader in the transition from Cold War confrontation to peaceful cooperation.


Thin film deposition R&D at Belarus defense institute
RF source manufacturing R&D at Paton Institute in Kiev
US-NIS high-temperature superconductivity applications development
MPC&A technology at Arzamas-16
UKRAINE
RUSSIA
Advanced manufacturing at Chelyabinsk-70
KAZAKHSTAN
Former Soviet Union
Beryllium processing at metallurgy center in Kazakhstan

Above: Examples of Los Alamos activities in the four NIS areas: Russia, Belarus, Kazakhstan, and Ukraine

Left: American, Russian, and Ukrainian experts install microwave processing equipment at Los Alamos.

Right: At Ancho Canyon, Los Alamos, American and Russian scientists collaborate on a high-explosives, pulsed-power experiment to measure the critical magnetic fields of a high-temperature superconductor.

Countering Nuclear, Biological, and Chemical Weapons Proliferation and Terrorism

Concern about the proliferation of nuclear, biological, and chemical (NBC) weapons of mass destruction and about NBC terrorism is decades old. In the past, the threat of NBC terrorism was not regarded as high, and accordingly, U.S. national security planning and policy did not include a major focus on the response to domestic NBC threats. Recent developments represent a significant change. The smuggling of nuclear materials from the former Soviet Union, the terrorist use of nerve gas in a crowded Tokyo subway, and the widespread availability of technologies applicable to the manufacture of biological weapons make NBC terrorism a more urgent threat to our national security. To ensure that our technology development efforts are effective in dealing with the problems at hand, we must (1) better understand and characterize the NBC threat; (2) analyze the military and civilian vulnerabilities of both the United States and our allies; and (3) assess our policy and technical, organizational, and operational responses to the threat.

Nonproliferation and Counterproliferation Programs

Los Alamos' nonproliferation and counterproliferation programs are integral to the Laboratory mission and support national security objectives across a broad spectrum of technologies.

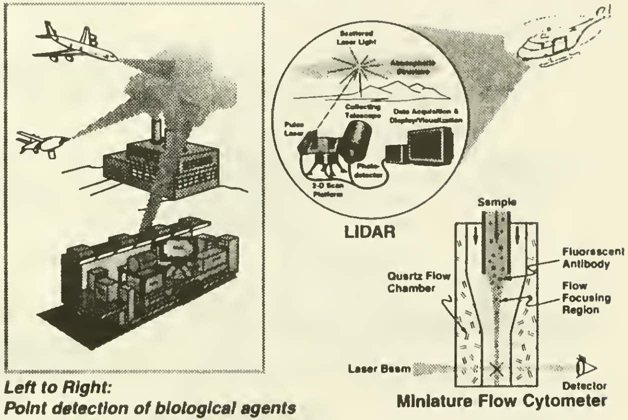
> The primary national security challenge, now and probably for the foreseeable future, is *"to prevent . . . weapons of mass destruction, whether chemical, biological, or nuclear, and the scientific knowledge of how to make them from going all over the world, to rogue groups, to terrorist groups, to rogue nations."*
>
> Senator Sam Nunn
> 1995

"I have made nonproliferation one of our nation's highest priorities."

President Bill Clinton
United Nations
September 17, 1993

Deter	Detect	Protect	Respond
Mission			
Arms Control/ Treaty Verification Safe, Secure Dismantlement Materials Control and Disposition	Detect Proliferant Activities	Troop/Civilian Protection	Interdiction/ Remediation
Task			
Materials Control, Accountability, and Disposition	Intelligence Analysis and Assessment	Defend and Protect Forces	Threat Destruction/ Emergency Response
Technologies			
← Modeling and Simulation →			
Materials Accountability	Threat Assessment	Battlefield Environment	Interdiction/ Response Options
← Sensors →			
Safeguards	Remote Detection	Local Detection	Targeting/Damage Assessment
← Advanced Technologies →			
Materials Disposal Systems		Theater Missile Defense	Advanced Munitions
		Protective Counter-measures	Environmental Remediation

Above: Technologies to support mission needs



Left to Right:
Point detection of biological agents
Long-range biological detection system
Chemical analysis by laser interrogation of proliferation effluents (CALIOPE)

Nuclear Emergency and Proliferation Response

Nuclear emergency and proliferation response (NEPR) is an extensive program for responding to and defending against nuclear incidents, threats, and emergencies. The program includes

- developing the necessary technologies for dealing with a broad spectrum of nuclear incidents, threats, and emergencies;
- responding to nuclear emergencies when the NEPR assets of the Nuclear Emergency Search Team (NEST) and Accident Response Group (ARG) are needed;
- mitigating the effects of nuclear incidents, accidents, threats, and emergencies when they occur;
- using technical resources to neutralize (detect, locate, diagnose, assess, and disable) nuclear devices aimed at U.S. interests by proliferating states, extranational entities, and terrorists; and
- intervening when nonproliferation fails or when asked to provide expertise about nuclear devices and materials.

Los Alamos NEPR Programs

The Los Alamos NEPR programs are built around NEST and ARG activities and aim at extending those activities to a broader set of circumstances, as well as developing and applying new technologies. The Los Alamos programs focus on R&D that

- improves nuclear detection;
- enhances our understanding of the behavior of nuclear materials, high explosives, and related materials in unconventional nuclear devices and situations; and
- allows us to develop NEPR capabilities such as assessing (rapidly and completely) unusual and unorthodox devices and designs; defeating, disabling, or dismantling a broad variety of unusual and unconventional nuclear devices; and mitigating and limiting the effects of a nuclear device before, during, and after attempts to disable it.

NEPR assets are used when nuclear threats, incidents, and emergencies occur that affect U.S. territories and/or U.S. citizens and property overseas. In support of U.S. interests, NEPR assets also may be used to assist U.S. allies.

Los Alamos programs support national security objectives across the spectrum of nuclear emergency and proliferation response activities. NEST and ARG exercises are shown here.

DoD Programs Springing from and Complementing the Nuclear Program

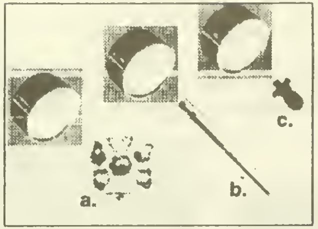
Supporting DoD User Needs

Los Alamos provides a broad spectrum of technological capabilities to respond to DoD requirements and future needs for national defense and security. These capabilities range from basic research to integrated, fielded systems in support of

- providing technology for the force structure of the future;
- strengthening the defense infrastructure required for future national security, including partnerships with the defense industrial sector; and
- strengthening the defense science and technology base through strategic partnerships with the defense user and science and technology communities.

Technology Platforms and Applications

- Conventional Weapons
  - Energetic materials
  - Firing systems
  - Materials modeling
  - Continuum dynamics codes
- Beams and Sensors
  - Optical detection
  - Pulsed-power systems
- Materials Technologies
  - Advanced processing
  - Characterization
- High-Performance Modeling and Simulation
  - Systems analysis architectures
  - Forces engagement scenarios
- Environmental and Biological Technologies
  - Demilitarization of energetics
  - Bioremediation

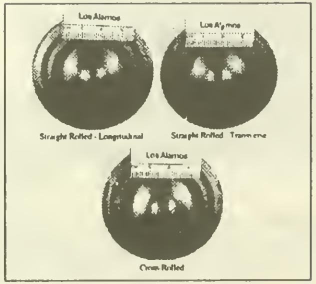


Multimode warhead technology
a. fragments
b. shaped charge
c. explosively formed penetrator (slug)

(Enabling capabilities—electronic firing systems, HE/metal interactions, 3-D hydrocodes)

Bioagent detection using helicopter LIDAR

(Enabling capabilities—laser propagation and optical sensing)



High-rate biaxial testing of materials

(Enabling capabilities—links materials processing, properties, performance)

Summary

> *"The continued maintenance of a safe and reliable U.S. nuclear deterrent is a cornerstone of U.S. national security policy. The objective of the plan for stockpile stewardship is to maintain a high level of confidence in the safety, reliability, and performance of the U.S. nuclear weapons stockpile in the absence of nuclear testing."*
>
> President Bill Clinton
> November 1993

The primary mission of the nuclear weapons stewardship program is to ensure that our country's nuclear stockpile is safe, secure, and reliable. Carrying out this mission involves a cadre of scientists and engineers (many with unique skills) that address the remarkably diverse range of technical issues associated with nuclear weapons. In addition to the people, a suite of facilities is required to obtain needed information and service the stockpile as it is affected by aging and other changes. Ensuring the stockpile in the long run requires the creation of a stable and intellectually challenging program that will continue to attract top technical talent to national defense activities.

We will perform this mission within the broader context of the DOE's commitment to reducing the global nuclear danger and securing the nuclear future.

Acronyms/Glossary

Acronyms

This list includes acronyms that may not appear in this document but may be encountered during further reading.

ACM	advanced cruise missile (Los Alamos designed the W80 warhead for this system.)
AEDA	atomic energy defense activities
AGEX	aboveground experiment
ALCM	air-launched cruise missile (Los Alamos designed the W80 warhead for this system.)
ANSI	American National Standards Institute
APT	accelerator production of tritium
ARG	Accident Response Group
ASCI	Accelerated Strategic Computing Initiative
CALIOPE	chemical analysis by laser interrogation of poliferation effluents
C^3I	command, control, communications, and intelligence
CISA	Center for International Security Affairs
CRADA	cooperative research and development agreement
CTB	comprehensive test ban
CTBT	comprehensive test ban treaty
2-D, 3-D	two-dimensional, three-dimensional
DARHT	Dual-Axis Radiographic Hydrotest Facility (Los Alamos, under construction)
DP	Defense Programs (DOE) (This part of the AEDA budget addresses stockpile stewardship and maintenance.)
EIS	environmental impact statement
ENDS	enhanced nuclear detonation safety
EOS	equation of state
ES&H	environment, safety, and health
FADES	Focus on Analysis and Documentation in the Enduring Stockpile
FSU	former Soviet Union
FXR	Flash X-Ray Facility (Livermore)
giga	10^9
GWe	gigawatt electric
HE	high explosive
HIDS	highly integrated detonation system
ICBM	intercontinental ballistic missile (Los Alamos designed the W78 warhead for the Minuteman III delivery system.)
ICF	inertial confinement fusion
IHE	insensitive high explosive
JTA	joint test assembly
LANL	Los Alamos National Laboratory
LLNL	Lawrence Livermore National Laboratory
LANSCE	Los Alamos Neutron Science Center
LIDAR	light detection and ranging
MC	military characteristic
MC&A	material control and accountability
MM II	Minuteman II
MPC&A	material protection, control, and accountability
MPP	massively parallel processing
NBC	nuclear, biological, and chemical
NEPR	nuclear emergency and proliferation response
NEST	Nuclear Emergency Search Team
NIF	National Ignition Facility (proposed)
NIS	newly independent states (of the former Soviet Union)
NPR	Nuclear Posture Review
NPT	nonproliferation treaty
NTS	Nevada Test Site
OMB	Office of Management and Budget
PAL	permissive action link
PEIS	programmatic environmental impact statement
PHERMEX	Pulsed High-Energy Radiographic Machine Emitting X-Rays (Los Alamos)
POG	Project Officers Group (DoD)
R&D	research and development
RD&T	research, development, and testing
RF	radio frequency
ROD	record of decision
SBSS	science-based stockpile stewardship
SLBM	submarine-launched ballistic missile (Los Alamos designed the W76 and W88 warheads for the Trident missile systems.)
SLCM	ship- or submarine-launched cruise missile (Los Alamos designed the W80 warhead for this system.)
SMP	shared-memory multiprocessor
SNL	Sandia National Laboratories
SNM	special nuclear material
START	Strategic Arms Reduction Talks/Treaty
T	tritium (Tritium is a hydrogen isotope—^{3}H— with a half-life of 12.3 years.)
WAP	weapon appraisal process (This is part of the continuing documentation for weapons certification.)
WH	warhead
WMD	weapon of mass destruction

Glossary

This list includes terms that may not appear in this document but may be encountered during further reading.

benchmark	A point of reference from which future measurements can be made; something that serves as a standard by which others can be measured.
boost	The process by which fusion of deuterium-tritium gas inside the pit produces neutrons that increase the fission output of the primary.
burn	(see thermonuclear)
command disable	A subsystem of command and control features that destroy a weapon's ability to produce nuclear yield.
common-mode failure	A failure or defect affecting more than one class of weapons or weapon components; a particular concern with the enduring stockpile because it contains fewer than 10 weapon systems, many of which use identical components, components with common design features, or components manufactured using identical or similar processes.
computational modeling	The use of a computer to develop a mathematical model of a complex system or process and to provide conditions for testing it.
conventional weapon	A nonnuclear weapon.
deflagration	Rapid and powerful self-sustained burning of a propellant or explosive.
delivery system	The military vehicle (e.g., ballistic or cruise missile, artillery shell, airplane, submarine) by which a nuclear weapon would be delivered; most warheads have been designed for specific delivery systems (analogous to "carrier").
dual use/dual benefit	Projects that have uses in or benefits for the defense sector and private industry or the civilian sector.
dual revalidation	The term applied to a robust form of peer review of individual weapon types, involving the DOE design laboratories and the DoD Project Officers Groups (POGs).
enduring stockpile	The U.S. nuclear stockpile of the future, consisting of fewer than 10 weapon systems (many of them older than their design lifetime), with no new systems added to the stockpile for the foreseeable future.
enhanced nuclear detonation safety	The current standard for nuclear detonation safety, implemented through the use of sophisticated electrical firing system safety devices; specifies that the probability for unintentional nuclear detonation will be less than 1 in 10^9 in normal environments and less than 1 in 10^6 in an accident or in abnormal environments.
fire-resistant pit	The fissile portion of a nuclear weapon (the pit), designed and constructed to resist the dispersal of plutonium and other fissile materials in the event of a jet-fuel fire or other high-temperature accident.
fusion	Nuclear reaction in which light nuclei are fused to form a heavier nucleus, accompanied by the release of immense amounts of energy and fast neutrons.

high explosive	An energetic material that detonates (instead of deflagrating or burning); the rate of advance of the reaction zone into the unreacted material exceeds the velocity of sound in the unreacted material.
hydrodynamics	The study of the motion of a fluid and of the interactions of the fluid with its boundaries, especially in the case of an incompressible, inviscid fluid.
hydrodynamic test	High-explosive, nonnuclear experiment to investigate hydrodynamic aspects of primary function up to the mid-to-late stages of pit implosion.
implosion	The sudden inward compression and reduction in volume of a material; in a nuclear weapon, the fissionable material is imploded through the use of high explosives.
inertial confinement fusion	The rapid implosion of a high-density pellet or target containing fusion fuel (usually deuterium and tritium) under bombardment of laser or charged-particle beams; the target is heated almost instantaneously to extremely high temperatures to produce a core that undergoes fusion before the rest of the target flies apart.
insensitive high explosive	A high explosive that is specifically formulated to be less sensitive to shock and other stimuli that might be encountered in an accident; usually based on the compound TATB (triaminotrinitrobenzene); insensitive high explosives have lower energy densities than conventional high explosives, and thus more material is required to produce the same explosive energy.
laser sintering (selective)	A rapid prototyping technique that uses the energy of a scanning laser to melt a plastic powder and form a prototypical solid part. The laser rapidly scans a plastic powder bed, forming the part layer by layer. Control of the laser is accomplished using a computer-generated solid model of the desired end product.
limited-lifetime component	A weapon component that decays with age and must be replaced periodically.
massively parallel processing	An approach to high-performance computing in which many microprocessor-based computers (tens to hundreds) are interconnected, each with access to common data-storage volumes and other computing resources; the computation being run is broken into small segments and partitioned among the many processors, where each piece is solved in parallel with the others. This approach promises dramatic increases in computational speed.
nondestructive evaluation	Test method that does not involve damage to or destruction of the test sample; includes the use of ultrasonics, radiography, magnetic flux, and other techniques.
noninvasive imaging	Imaging method that does not damage the test specimen; includes radiography, computed tomography, and other techniques.
nonnuclear component	Any one of thousands of parts that do not contain radioactive or fissionable material but are required in a nuclear weapon.
nonproliferation	Preventing the spread of nuclear weapons, nuclear weapon materials, and nuclear weapon technology.

nuclear assembly	Collective term for the primary, secondary, and radiation case of a nuclear weapon.
nuclear component	A part of a nuclear weapon that contains fissionable or fusionable material.
nuclear weapon	The general name given to any weapon in which an explosion can result from the energy released because of the fission and/or fusion of atomic nuclei.
nuclear weapons complex	The collection of laboratories, production plants, and military services involved in the design, production, and testing of nuclear weapons.
nuclear warhead	A warhead that contains fissionable and perhaps fusionable material; the nuclear assembly and nonnuclear components packaged as a deliverable weapon.
performance	The ability of a nuclear weapon or weapon system to operate in a specified manner (e.g., yield, range, accuracy, radiation spectrum) under stated conditions (essentially equivalent to reliability).
permissive action link	A use-control and security system that requires the receipt of a classified code to unlock a nuclear weapon in preparation for arming.
prototyping	Complete simulation of the product design, performance, and manufacturing processes before production is undertaken.
reliability	The ability of a nuclear weapon, weapon system, or weapon component to perform its required function under stated conditions for a specified period of time (essentially equivalent to performance).
robust performance	The sturdiness or lack of sensitivity of a weapon design to small changes that might result from aging or remanufacturing.
safety	Minimizing the possibility that a nuclear weapon will be exposed to accidents and preventing the possibility of a nuclear yield or plutonium dispersal should there be an accident involving a nuclear weapon.
security	Minimizing the likelihood of unauthorized access to or loss of custody of a nuclear weapon or weapon system and ensuring that the weapon can be recovered should unauthorized access or loss of custody occur.
shared-memory multiprocessor	High-end workstation-class "compute server" with multiple processors having fast access to a common compute memory.
special nuclear material	A specific list of materials, including plutonium and enriched uranium (but not tritium).
stockpile management	The specific tasks and functions involved in managing the stockpile weapons, including production, routine surveillance and servicing, assembly and dismantlement, and disposal of weapons-related parts and materials.
stockpile stewardship	The science and technology aspects of ensuring the safety, security, and reliability of the stockpile, including research and development to provide the technologies required for stockpile management.

stockpile surveillance	Routine and periodic examination, evaluation, and testing of stockpile weapons and weapon components to ensure that they conform to performance specifications and to identify and evaluate the effect of unexpected or age-related changes.
stockpile-to-target sequence	The range of environmental conditions, including temperature, moisture, acceleration, and vibration, that a weapon must be able to withstand and still function properly.
supercritical fluid	A fluid at a temperature above its critical point. Supercritical fluid solutions are characterized by high density, leading to very-high solute loading, low viscosity, and high molecular diffusivity. Such solutions exhibit compressibilities one to three orders of magnitude greater than those of other fluids.
surety	Umbrella term for safety, security, and use control.
system integration	Ensuring that the nuclear and nonnuclear components of a weapon meet performance requirements individually and as a system (see weaponization).
teraFLOPS	A unit of computing speed, 10^{12} floating point operations per second
test readiness	Maintaining the critical technologies, staff skills, and infrastructure to be able to resume nuclear testing if and when mandated by the President of the United States.
thermonuclear	The process by which very high temperatures are used to bring about the fusion of light nuclei (e.g., deuterium and tritium), with the accompanying release of energy.
tomography	Sectional radiography; a technique for making radiographs of plane sections of an object and combining the "slices" using sophisticated computer programs to produce a three-dimensional image of the object; a promising technique for noninvasive imaging and nondestructive evaluation.
use control	Delaying or preventing the unauthorized use of a nuclear weapon or weapon system while allowing timely authorized use.
warhead	Collective term for the package of nuclear assembly and nonnuclear components that can be mated with a delivery vehicle or carrier to produce a deliverable nuclear weapon.
weapons laboratories	Term for the three DOE national laboratories—Los Alamos, Livermore, and Sandia—that are responsible for the design, development, and stewardship of U.S. nuclear weapons.
weapon system	Collective term for the nuclear assembly and nonnuclear components, systems, and subsystems that comprise a nuclear weapon.
weaponization	Converting the functional requirements for a weapon into integrated system designs and prototype hardware (see **system integration**).

Senator KEMPTHORNE. Dr. Hecker, thank you very much.

Senator Bingaman.

Senator BINGAMAN. Thank you very much, Mr. Chairman.

Let me ask a somewhat related question that came up in the earlier panel. If one of our ultimate goals in this whole venture is to reduce the danger that we and the rest of the world face from nuclear weapons, if that is a purpose we are all agreed up, I'd be interested particularly in the three laboratory directors just commenting on the role that they think these laboratory to laboratory contacts with Russian number facilities are having in helping reduce the danger that the country and the world face from nuclear weapons.

Are these an important part? I mean, we have a question around here which comes up every year as to whether or not to provide all the money that the department asks for to support this kind of activity or whether to cut in these areas.

Is this a priority or is it a lesser priority, in your opinion. Let's start with Dr. Robinson.

Dr. ROBINSON. Senator Bingaman, it is a complex issue. The success that has happened in the laboratory to laboratory program must be put in the context that it is a back door approach to doing the things we'd like to do. The front door, which is the official Russian position on these things, has been not to address as deeply the concerns of locking up material, of dismantling weapons. The safeguards, transparency, irreversibility initiative seems to be stalled.

So we were asked what we could do, and what we have been going—as I think Ms. Rohlfing mentioned—with a laboratory by laboratory negotiation about what might be done to improve the security of weapons at that laboratory, and would we be willing to try it. We have been successful and the numbers are growing.

It is still a piecemeal approach to the problem of the great quantity of nuclear material that is in that country without safeguards.

Senator BINGAMAN. Dr. Tarter, did you have a comment on this?

Dr. TARTER. I think the program to date has exceeded the expectations in both the information it has provided, the ability to understand one another's cultures, and the ability to accomplish the diverse objectives which were set out.

How to size that program in the future? I think Paul captured it very well. At some point, this does have to become a long-term thing. Some level has to be set, some ultimate purpose has to be set, and I think that probably deserves continued examination.

But I think we have been very careful, measured, and quite successful in accomplishing the objectives to date.

Senator BINGAMAN. Dr. Hecker?

Dr. HECKER. I want to give a very positive response and will say, first of all, that we do have indications directly from our counterparts in Russia that the activities we have had, the joint scientific activities, have kept their people in Russia and associated with their program, rather than working with somebody else, on the Internet, perhaps.

So to your specific question, I think it has been positive.

But in addition to that, which is much more difficult to measure precisely, we also have to make sure do we really have positive indications that the things we've done with the Russians have helped, in Mr. Curtis' words, reduce the global nuclear danger. I think so in a very specific way, and that is particularly the materials protection, control and accountability.

What we have been able to do by going in in the laboratory to laboratory mode is help to close the window of vulnerability of Russian nuclear materials, and that is to help them, to work with them technically and also through the financial aids to get their arms around and provide modern safeguards to their nuclear materials.

We are much further ahead today than we were 2 years ago. Two years ago, there was, in essence, no modern safeguards. It was guns and guards that safeguarded the Russian nuclear materials. Now, 2 years later, thanks to the DOE laboratory to laboratory program, the Russians now have a significant amount of their nuclear materials under safeguards and the rest of it in the process of doing so.

In terms of the scientific collaborations, I would say we not only have to be able to demonstrate that perhaps we have kept the Russians away from Iraq, Iran, or North Korea, but we also have to ask for the money that we have invested, have we gotten a good scientific return.

I would maintain that, at least for what we have done with the Russians, I can demonstrate that we have gotten significant scientific input from the Russians on problems that we are interested in.

I think the same goes for this industrial partnership program. Again, it is a question: has anything come back in this direction. I think there most of the technology has flowed from the Russian institute to U.S. industries or to the U.S. laboratories.

I think those are the positive returns and, because of that, I make a very strong statement, that these programs have been very beneficial to the United States.

Senator BINGAMAN. Thank you. I guess I've got time for one other question here, Mr. Chairman.

Senator KEMPTHORNE. Sure.

Senator BINGAMAN. I asked Dr. Smith about shifting 050 account money over to the Department of Energy and he was not particularly enthusiastic about that. It strikes me that by saying that the Department of Defense will not do that if additional funds are needed to maintain the Stockpile Memorandum, he is essentially saying that maintaining the nuclear deterrent is a lower priority than maintaining conventional capability for the Department of Defense. That seems wrong-headed to me.

I don't know if any of you has a point of view here. Maybe I m asking you to tread where you should not tread here. I guess the other piece of that question, which I will also throw out, if any of you wants to comment on it, is the issue about taking funds from environmental cleanup.

If those are the two options, shifting funds from the conventional budget of the Department of Defense or taking funds from the environmental cleanup program, which is anticipated, what makes the most sense from your perspective? Does any of you want to jump in on that?

Dr. Robinson, you look ready to answer that question, so go ahead. But first, let me just add to that, when you look at the long-term budgets of the Republican controlled Congress and the Clinton administration, there is essentially the same amount of money to be spent. The Republicans want to spend a little more in the next couple of years; the President wants to spend more in the outyears. But there is really no difference, as I see it, in the amount of money that people expect to spend in these areas. Let me just add that qualifier.

Dr. ROBINSON. Senator, I think Dr. Smith would agree with me. The number one priority, whether it's viewed from the DOD side or the DOE side, is the reliability and the safety of the deterrent force. I suspect this is a bureaucratic positioning between DOD and DOE. Today we believe the stockpile is safe, secure and reliable. If there were a very serious problem, I have little doubt but that the Nuclear Weapons Council would take every action. Their priority guide, their guide star would be to correct the problem.

Between the stockpile and environmental cleanup, safety is a very high priority. I don't think we have an urgent safety problem in the environment that threatens either the workers or our citizens. If we had such, its priority would move up. But safety is one of the basic factors one has to compare in the DOE–DOD balance of responsibility. For me, my judgment today is the stockpile is very safe, and I suspect Dr. Smith would agree with that.

Senator BINGAMAN. Does anybody else want to comment? I am not urging that everybody do so.

Dr. Hecker?

Dr. HECKER. I would just like to say, from my perspective, that we have laid out a plan with Dr. Reis over 10 years, and what we have said is to get the job done in nuclear weapons stockpile stewardship and management will take about $4 billion roughly for 10 years. That is what I am most interested in.

How the Department of Energy and the Department of Defense negotiate where it comes from and when it comes, that is really their business. On the environmental cleanup, the only thing I could add is we are willing to work hard to reduce the bill for the environmental cleanup. But, again, that is really not an issue that is for me to decide, where the money comes from.

Senator BINGAMAN. One more?

Mr. SCHWALLIE. I would just add one thing from a different perspective.

First of all, it would be against the law for a contractor to do that, in terms of managing money differently than what is allocated. But the point I would give to you is, however that comes down, being at Savannah River and receiving funding from several different sources, today there is very little absorptive capability in the funding matching the scope you're doing. So you have very little freedom to move moneys without impacting somebody, whether it is a State agency, a Federal agency, or a mission requirement or a defense requirement.

I think we would all say we are extremely tight in the ability to use funds or allocate funds, or what have you, to different kinds of things. That may not have been the case a few years ago.

Mr. GUSTAVSON. From the Y–12 standpoint, there are lots of things on the plate in terms of production, in terms of deliverables for test assemblies and our reduction efforts. But, clearly, the safety and reliability of the stockpile is our number one goal, and all things are secondary to that.

I think in the future what we need to insure is that we have a balance between the research and the manufacturing capability so that when and if we find a problem in our nuclear stockpile in terms of reliability, assurability, or credibility, that we have the procedures, the people, and the techniques in place to go and fix that.

Senator BINGAMAN. Thank you very much, Mr. Chairman.

Senator KEMPTHORNE. Senator Bingaman, thank you very much.

I would like to ask the laboratory directors to describe how long it will take to arrive at a point where we will know whether the stockpile stewardship will work at the present stockpile stewardship funding rate. How long until it would be fully operational under the same assumption?

Dr. ROBINSON. Let me start by saying I don't think we know. We talked with the White House about the President's commitment to a zero yield, a Comprehensive Test Ban Treaty position. We explored that issue in some depth.

The science-based stockpile stewardship is an approach, and certainly without a testing program it becomes a very necessary approach. Whether it will be sufficient is something only time will tell. I don't think we know, and my suspicion is it will be many years before we will know.

Now we were not ready to just settle at that point with this unknown. The President made three commitments to us. The first one is that he would consider the maintenance of a safe and reliable nuclear stockpile as a supreme national interest of the country. This means if a serious problem does arise before we have found a way to do without testing, he would order a nuclear test, which would mean withdrawal from a potential treaty.

The second, he put in the annual recertification, which raises the level of consciousness and attention of everybody involved in this, whether its plants, labs or certainly the military services. It is a joint recertification that will be done every year.

So a spotlight will show the condition of the nuclear stockpile and if science-based stockpile stewardship is working.

The third one is the budget support. I think on that basis, we are moving forward. But I cannot offer you a guarantee.

Senator KEMPTHORNE. Thank you.

Dr. Tarter?

Dr. TARTER. I think your question has several ways of answering it. I would start by saying that it is not a program which you will find in some period of time—9 years or 11 years—that, all of a sudden, we now know or not know. We are basically testing effectively stockpile stewardship and management without testing every day, and we have been doing so for some time.

What we now have is a blueprint and a set of activities that are going to focus our activities in that program. It is not something which we are going to bring together in some number of years. We are doing it continuously. We are now beginning to do it with a focus.

I think the things which Dr. Robinson mentioned, some of the new ways you will be able to measure it, are the specific revalidation activities. For each of the warheads in the stockpile we have a very precise set now—and I think Dr. Reis referred to this—of activities that will validate and test each of the components, each of the systems. So you will gain information using the tools available as they are brought into place.

I think on the point you made earlier in your opening statement, that we will soon have the oldest stockpile in history, we will expect that the seriousness of the issues is likely based simply on age to increase as time goes on. So the ability of those tools to explore those more difficult issues I think will match, in a sense, the confidence and the reliability.

So I think we will have greater capability with greater need. But we are doing it all the time, and I think if we follow that plan and have the budget to support it, then I am reasonably confident that we will test it all the time each year.

Senator KEMPTHORNE. Thank you.

Dr. Hecker.

Dr. HECKER. Let me try to augment the comments of my colleagues by saying the following. We have not tested for 3.5 years now, essentially, and with no testing, the confidence declines, but I think quite gradually.

The new tools which you have mentioned already and that we have mentioned in the past will take some time to really develop and come into full fruition.

However, what really helps us in the short term is the fact that the weapons that we have in the stockpile have a good pedigree of nuclear tests and the people who designed them and who engineered them are either still at the laboratories or still alive.

And so, that is why we are able to come back and say to you that we say today the stockpile, the ones we designed, are safe, secure, and reliable. So what we have is, while we have these folks around, we want to make sure that we get these new tools. It is not just the additional computing, but it is the things that I mentioned earlier—more assessment of the stockpile, the enhanced surveillance techniques to make sure that we get some experience with remanufacturing and that we can validate that, as newly manufactured, these weapons are going to be able to do the job.

And so, I think, because of that, we will never see a great step funding that we'll say aha, today we've got it. We gradually lose confidence because the people won't be there anymore, but we'll build up the new tools. As I referred in my testimony, I was concerned to make sure that we make the right investment in fiscal year 1997 that that transition is a smooth one.

Senator KEMPTHORNE. All right. Thank you very much.

Senator Bingaman.

Senator BINGAMAN. I have no further questions, Mr. Chairman, thank you.

Senator KEMPTHORNE. To our production facilities, to the directors, you heard an earlier discussion that I had with the previous panel about $143 million which we had authorized to use, in essence, for modernization, which really did not come about. I would like to know your perspective on that. Was that a critical issue and should we be addressing it?

What would you do at your respective facilities with regard to modernization?

Dr. WEINREICH. First of all, let me say that the money that we are about to receive is being used for modernization, at least in our case. Our first priority there is to support the enhanced surveillance program, which I see as a keystone or the cornerstone of stockpile surveillance and management program which has been laid out. I sincerely support that.

We have been working on this with the labs for some time, even before the stockpile stewardship and management draft PEIS came out.

So we intend to use part of that money to support that program. But the rest of the money is going to support modernization of our plants. In fact, we have identified in a short period of time a total of $45 million worth of projects that we could implement to modernize if we had the funds.

Now we are receiving $17 million of that. But most of that, like I say, in fact all of it, is going to be spent on modernization upgrades.

Senator KEMPTHORNE. I don't know if you can put a number on this, but how much more modernization would be required? Is that a fair statement? I mean, are you at 50 percent and you are halfway there?

Dr. WEINREICH. That is an excellent question. Unfortunately, it is the kind of thing which we are just beginning to really think about.

Normally, you think about this in terms of capital projects, line item projects or GPP, some expense projects, and you put that into your long-range planning. The concept of how can we improve our manufacturing capability is something that has not had a lot of emphasis in the past, but now it is getting a lot more because you not only want to improve your manufacturing capability, but you need to maintain the capability both in terms of facilities and people that you have.

So it is important if you are going to maintain the technical competency to be able to have challenges for those people, and you also need to continue to upgrade to the most modern technology. It ends up being more cost efficient, obviously, so we can reduce costs by doing that.

Senator KEMPTHORNE. All right. Thank you.

Mr. Gustavson.

Mr. GUSTAVSON. From a Y–12 standpoint, we are spending money also in 1996 and 1997 in enhanced surveillance. We have a partnership with both of the labs, Livermore and Los Alamos, on about 23 different projects plus some that are directly starting at Y–12.

We also have been supporting the reestablishment of our disassembly and assembly capability so we can continue to support the shipments from Pantex and the disassembling of those secondaries for proper storage. In addition to that, we are still looking at the resumption of enriched uranium.

We have had some good modernization efforts 2 or 3 years ago, and we are now looking at what we could do in the future to make our plant more efficient. In most cases, where we have the older equipment, such as up in the enriched uranium chemistry and technology area, the equipment works fine. But we need to go look at it in the future to see if we can make it more cost efficient for a smaller production capability.

Senator KEMPTHORNE. Thank you.

Ms. Clegg?

Ms. CLEGG. Senator, we have used the $28 million that we received for enhanced surveillance, for some infrastructure upgrades, and then for process capability assurance programs, which is the way we keep our technologies active.

We worked with the labs and with the production plants in allocating and deciding what projects we'd work under enhanced surveillance.

With respect to the capability assurance program funding in the infrastructure, we had already planned on doing this anyway. So we are grateful for the money to offset some of our operating shortfalls.

Our plant has been modernizing through the years. We have had funding to do that. We have a miniature microelectronics facility, which is a Class 100 clean room. Another thing that we have is a flexible manufacturing system. So we have been fortunate to keep our plant pretty well upgraded.

Our concern is for the future. Will there be continued funding? We think that for a facility our size, it takes about $8 million to $10 million a year to capitalize our product lines. We will receive, under the PEIS, according to our proposal, $64 million to downsize our plant, and we will restructure it along process lines, which is a very modern way to manufacture, a very cost effective way.

But in addition to that $64 million, we are looking to the outyears when manufacturing technologies will definitely change. Will we be able to keep up with them in information systems and in the capital equipment that we need in order to do that work?

So if we were to use this money, part of the operating funds, for the technology assurance program, we would have used it for some of these upgrades.

I'd like to say that, with respect to PCAP, the process capability assurance program, it is very important to us, this kind of funding, because as Bill said, in the manufacturing side of the house, we have to be sure that our people are attuned to the advanced technologies, that they get ways other than the routine production work to keep their talents alive and energize.

We hear about the brain drain in the weapons complex. It applies to the production facilities as well as to the labs. When you're constantly downsizing and the future of the plant is being reevaluated every several years, it is very difficult to attract and then retain key talent for us.

So that is an issue for us. People want to work in a modern factory with the best technologies and they want to be able to keep up with the labs because it is exciting to work in partnership with the labs for our people.

Senator KEMPTHORNE. Mr. Schwallie, let me take this opportunity for a moment.

Ms. Clegg, you referenced the brain drain. I have talked about it earlier in this hearing, about this concern that we are not bringing along sufficiently the next generation of scientists, engineers, dealing with this particular need of the country. Is that real and how would you characterize it?

Let me stop there and then I will ask a follow-on question. Anybody, is it real?

Mr. SCHWALLIE. It is absolutely real.

Dr. ROBINSON. Yes.

Mr. GUSTAVSON. Yes.

Mr. SCHWALLIE. It is absolutely real. I have lost 40 percent of the senior technical people at my site and I have lost 50 percent of the people under age 30 that were hired in the late '80s and early '90s as the pipeline.

It was well said to my left, that these are technologies that are learned on the job and in the science of doing this, and are not taught in college. Retraining is excellent, but it is very hard to retrain and make tomorrow an actinide chemist or a tritium expert.

So this issue of brain drain, erosion of resources, loss of competency, is just seen every day.

Ms. CLEGG. If I might respond, manufacturing is an art as well as a science, and not everything can be written in procedures and work instructions. We pass it on from one person to another person.

Since 1990, our plant has downsized from 6800 people to 3300 people. Now, because our workload has gone up slightly, we are adding a few people back. We have less than 100 people who are under the age of 30. So we do have to be concerned about the future.

When you talk with our people, you will find that we have a very energized workforce. A lot of it has to do with how we communicate with people and have empowered them and use the total quality tools. But we have had some of our people leave because they want to go into an industry that they see has potential growth for them, and when you have downsized as much as we have—and we have had several studies about whether the production plant should stay in business—that gets to be a real key issue in attracting people. This is why the interface with the technologies and modernizing the plant remain so critical, to attract people and retain them.

Senator KEMPTHORNE. That goes to an earlier comment—I think, Dr. Tarter, you may have made it—that you need a 10 year timespan, that you can plan for 10 years and that your employees can know that they have employment for at least 10 years and will stay.

Dr. TARTER. That's right.

Senator KEMPTHORNE. Dr. Hecker, did you have a comment?

Dr. HECKER. Yes. I would like also to add that we have lost a wealth of experience in the nuclear weapons program in the past few years, no question about it. However, I would like to offer a much more optimistic picture at our laboratory. The issue that you raise is really one of the most important parts of my job, and that is how can I make sure that 10, 15, and 20 years from now we still have good people.

Quite frankly, what really helps a set of laboratories such as Los Alamos is that, while we have this defense core as the primary mission of the laboratory, we have insisted for 53 years to make sure that we do great science along with the defense and part of the defense work, and that we at least have some activities in the civilian technology arenas, because that allows us to keep an environment that attracts the best.

Just to give you an example, during the course of the year I have, let's say, 1,400 students at Los Alamos, that is, undergraduate and graduate students, mostly in the summer, but part through the rest of the year. I have close to 400 post- doctoral appointees there that are working on 2 to 3 years scientific assignments. So close to 2,000 people that are generally under the age of 30 are at Los Alamos in all kinds of programs, many of them funded with this laboratory directed R&D fund, for instance, to be able to do forefront science that keeps the environment there.

It is also why we work with industrial companies, to make sure that in technology we stay at the forefront. So, keeping that environment allows us to get people there.

Just a final comment on this, the science based stockpile stewardship approach has really given a rebirth in the interest in the nuclear weapons program at our laboratory. So I find an excitement today that is greater than it has been in the past 5 years.

Senator KEMPTHORNE. Good.

Dr. Tarter.

Dr. TARTER. I just might offer one comment along the same lines. I forget who was the original author of the statement, but it is obvious there are more smart people outside the weapons complex than inside of it, because there are a lot more people outside it. I think one of the things that has happened, particularly with working on both new, modern technologies, working on trying to develop, for example, the accelerated strategic computing initiative, is that we have reformed active partnerships with the leading computer manufacturers in this country. That has added more stimulation on both sides—not in the sense of transferring money, but in the sense that those will be the people who will produce the technology that will allow us to execute the programs.

But I think—and you will find this out if you had a hearing on that subject in the broader sense—it has been a tremendous stimulus through the leading people in both areas. So I think the connections to the top flight universities, to the top flight industries, to the leading technologies in the sense that we have a common mission in the country is one of those things that has added to the great excitement of the people in taking on this new mission.

Senator KEMPTHORNE. This is something that I would like to pursue. I would just mention to staff that we may undertake this through some commission of private sector individuals that we would ask to help us explore this and look for some way of creating the right atmosphere.

We had authorized in fiscal year 1996 a fellowship program to address this for the plants. Was that ever implemented by DOE? [No response]

Senator KEMPTHORNE. Apparently not. Okay, we will revisit that, too.

Dr. WEINREICH. We are aware of that, but it has not come down yet. We think that is an exciting thing to do.

I do not have discretionary funds at the plants, and we think that would be very exciting, just as it at the labs, to bring in people to work on manufacturing technology.

Senator KEMPTHORNE. The committee thought so, too, Dr. Weinreich, and we will pursue it.

Mr. Schwallie, I had cut you off earlier, I'm sorry, with regard to the modernization question.

Mr. SCHWALLIE. Sure, I will answer. We received $21 million and the basic choice there was to do three things with it. One is to support the advanced enhanced surveillance program, which we did and are doing. The other was how much to reinvest in our tritium facilities, the existing facilities, and we elected to not put much there right now because RTF, the new facility, is reasonably current, state of the art, and in return for that have identified a line item need in '98 to facilitate consolidation into that out of the older facilities.

What we chose to do with most of the money was to look at how we can support the new production program and primarily the accelerator side in terms of the infrastructure of accommodating that at Savannah River—in terms of land use and the preparation of assisting Los Alamos and demonstrating the technology, getting our people working with their people on the balancing plan, and making sure that the up front requirements in terms of the safety documentation, the safety standards, the operability, maintenance, and surveillance kinds of requirements are defined up front so that that is an efficient, operable machine once we get to that point.

And so, we took a little bit different twist on the money. But I think it is contributing to the overall goals of what is going on and how we would locate such a facility at Savannah River.

Senator KEMPTHORNE. Let me put this next into the category of pot luck.

To our laboratory directors, you have dedicated your lives to this entire issue. If you were a member of this committee, what would you make sure was an action taken this year that you could impact, whether it's something in the budget, or program, or policy, what have you ? Again, there is a question I have not asked you because I don't know that question. But, again, from your perspective of a lifetime, if you were sitting up here, what would you do?

Dr. Hecker?

Dr. HECKER. Let me take a stab at that. First of all, you have already done one of the most important things, in my opinion, and I have several of my colleagues here from the laboratory who will go back and report how pleased they were to see the intense interest in the health of our stockpile in the Senate hearing room. So to continue to show your support, that it is in your interest and that you support this program, is really key to our people so that they do believe they have this 10 year interest.

More specifically, I believe that the DOE stockpile stewardship and management program, sort of laying out for 10 years approximately $4 billion a year, supporting both the science based approach and then this new paradigm of integrating R&D, enhanced surveillance, and remanufacturing, and the capabilities at the plants, that probably to me is the single most important thing, that we have a sense we are going to take a 10 year look, we are going to transition to this new paradigm, and we are going to make it stick.

Senator KEMPTHORNE. All right. Thank you very much.

Dr. Robinson?

Dr. ROBINSON. Let me try. I think the most important thing you can do is to tell people this program is important. That is not so clear after the Cold War. There is the usual relapse of well of we didn't use those weapons during the Cold War and maybe we don't need them as much. There certainly are forces in society who would like to marginalize the value of nuclear weapons. If you believe they are important as America's greatest strength for adversities yet to come, it is important that we not lose the capabilities in the short term.

Senator KEMPTHORNE. Good point.

I think probably in today's atmosphere, it is not a real positive issue, nuclear weapons, mass destruction. So, you address a group of high school students and you wish to entice some of them into this industry. Probably it would be initially a tough sell.

But I think when you explain to all of those students that around this planet of ours there are people that know this technology and do you want to have someone in some rogue Nation determining when it may be opportune for them to use that device against us, or do you want to make sure that there is such deterrence in this country that they will never, ever give it a second thought, then I think it begins to change the equation a little bit.

So I think we can certainly do our part with the young people in addressing and selling the reason for a deterrence and that it is a very noble profession to be proceeding in.

Dr. ROBINSON. There is an old allegory about a town and a dam, that the floods had ravaged them enough that they decided to build a large dam, but realizing the dam needed maintenance, they would climb everyone into the mountains a month in the summer and they would do everything to repair the dam.

Well, after a number of years with no floods, it got harder and harder to get the people to make that trip up to the dam. In time, the dam eroded and the town was flooded.

We are, I believe, the keepers of the nuclear stockpile, the keepers of the "dam of aggression" throughout the world. I think the record of nuclear weapons to prevent war is a solid one and one we need to put forward.

Senator KEMPTHORNE. Yes. In fact, just to follow this for a moment, probably the terminology ought to be that these are the most successful peacekeeping instruments we have created.

Dr. ROBINSON. I agree, sir.

Senator KEMPTHORNE. Dr. Tarter?

Dr. TARTER. I think my response to your initial question already captured the sense, and I think Dr. Hecker reiterated that today.

In whatever fashion the committee chooses to express support and enthusiasm for both the profession, I think, as you have just captured it, and for its purpose, and for the general outline of the program is the most important thing which I need to do my job. I am not sure exactly how that is done, but that commitment, that sense of commitment, however the committee chooses to do that, is the most important thing.

I think at slight risk I will say one and half other things, perhaps.

My own perception is that the committee has provided particularly valuable guidance in assuring that the program retains a balance. I think I said that in my written statement among the various elements. I think that is something it is extremely important to do. There is always danger because of conflicting interests and competing demands.

The only thing I would ask of the committee is to keep very conscious—and you asked, so I will tell you—keep very conscious of those issues, make them very well known. But we are changing, as Dr. Hecker said, in all areas of the program, from what it was to what is a very different program. Cut us a little slack every once in a while and just allow us a little breathing room to make it right, because we are going to make some mistakes as we do it. But with a little slack and a commitment—and you have the commitment from us—I think we can actually get there.

Senator KEMPTHORNE. Okay, good.

To the production facilities, let me give you the opportunity for a one minute response. It's pot luck, anything that you would suggest to us if you would sitting up here that you would make sure happened, was in the budget, what have you.

Mr. GUSTAVSON. I would say, Senator, as has been said by some of our lab colleagues, and I do use the term "colleagues" because we are partnering with the labs, in order for our nuclear weapons stockpile to be a deterrent, it must be credible, and we must insure that it remains reliable. That, in my mind, requires a balance between the research and the manufacturing capability.

The manufacturing is a specialty business. We don't get a person who can machine uranium off the street. Those capabilities do not exist. The metal acts differently than any other metals that we have. So we need to keep that capability within the walls of the manufacturing complex so that we can use it to maintain the credibility of our defense.

Senator KEMPTHORNE. Good. I appreciate that.

Ms. Clegg.

Ms. CLEGG. I would echo what Gus said, that you can foster an environment where we optimize the whole weapons complex, the labs and the production plants, because the labs and the plants both have valuable assets, unique capabilities, talented people and core competencies that need to be maintained to insure a safe and reliable weapons stockpile.

Senator KEMPTHORNE. Good.

Mr. Schwallie.

Mr. SCHWALLIE. I'm seeing a much greater trend of holistically looking at the integration of all of these sites than I have ever seen before. We need to promote that and not let anybody think there is jeopardy in that process of working together, but looking at these sites.

You've obviously got seven here that perhaps deserve some priority ranking and thinking as you go forward in terms of what goes there.

Ultimately, in the long-term, we need to get restructuring behind us and give our people that future, that commitment, that we are investing in them as they invest in us. I think let's keep working together. I think the process has started and it's going to go well. It is an innovative, science based program that we can make work. There is a role for several and we need to find that, get it behind us, and then get some stability out there in the field.

Senator KEMPTHORNE. I appreciate that.

Dr. Weinreich.

Dr. WEINREICH. I guess I would agree. I think this is a case where obviously there is a need for integration between the labs and the plants and that is improving. Even though we have been involved with the labs ever since we have been in the weapons business, so to speak, and they actually have a presence at Pantex now, I think it is important to continue that. There are certain capabilities that we each have. But I think if you look at it and respect those capabilities, what we will end up with is the whole will be greater than the sum of the parts.

Senator KEMPTHORNE. Great.

I thank all of us. This is excellent information that you have imparted to us. Really, because of the nature of the issue we are dealing with, we could go on for hours. So I look forward to a future opportunity.

This is probably one of the largest panels that we have had. But I could not determine who not to invite. You are the right ones that ought to be at the table, and I think we need more opportunities to all be around the same table so that we can discuss this and come up with ideas, be innovative and get the job done for the folks we all work for.

So, again, I thank you for all of your efforts both here today and also in carrying out your responsibilities.

With that, this hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

SRS TRITIUM ACTIVITIES

Senator THURMOND. Dr. Reis, the fiscal year 1996 Conference language places the new tritium production facility at the Savannah River Site because that's where our tritium infrastructure is. To what extent have you involved the Savannah River Site Federal and contractor workforce in the design and siting of this project at Savannah River? To what extent will you commit to further engage this workforce in the near future? How much will you allocate to SRS for this mission in fiscal year 1996? In fiscal year 1997?

Dr. REIS. The Savannah River Operations Office (SRO) and the Savannah River Site (SRS) contractor, currently the Westinghouse Savannah River Company (WSRC), are and will continue to be deeply involved in both the commercial reactor and accelerator projects. Regardless of which option is chosen for primary tritium production, the SRS contractor will ultimately have responsibility for the tritium production mission.

The Accelerator Produced Tritium Project Office, currently located in Albuquerque, due to its proximity to the Engineering Development and Demonstration (ED&D) phase of the project at the Los Alamos National Laboratory, is staffed by personnel from DOE Headquarters and from the Albuquerque and Savannah Rivers Operations Offices. WSRC personnel are assisting with the ED&D. If an accelerator facility is selected as the primary tritium supply technology, the project office will move to the SRO during the design stage of the project because the SRS contractor will have a major responsibility to provide maintenance and operations input to the design. During the construction and commissioning phase, the SRS contractor would support construction planning, assist commissioning, and train its staff to operate the plant.

WSRC is also supporting the commercial light water tritium project in target development and certification and in tritium transportation, safety, and waste management. The SRS contractor will provide support for the design of the tritium extraction facility and will take the lead for its construction and commissioning.

The SRS was allocated $20.1M in fiscal year 1996 for support of the tritium production projects, about 27 percent of the total amount budgeted. The fiscal year 1997 allocations have not yet been determined but could range from $3.5M to $26.5M, depending on the results of detailed project planning currently in progress and involving all contributing laboratories and sites, including the SRO.

TRITIUM REQUIREMENTS AND THE NWSM

Senator THURMOND. Mr. Curtis, please relate the tritium requirements in the Nuclear Weapons Stockpile Memorandum just signed by the President to the need for tritium production capacity from the accelerator proposed by DOE? Specifically, will DOE try to get by with tritium production from the existing civilian light water reactor option, and not build the accelerator?

Mr. CURTIS. Either production option (accelerator or existing civilian reactor) can produce enough tritium in time to support the Nuclear Weapons Stockpile Memorandum recently signed by the President.

The Department has made no decision regarding which option it will pursue as the primary tritium production source. The Department is now engaged in a 3-year exploration of both options, an accelerator-based production facility and existing civilian light water reactors. In 1998, the Department will chose one option as the primary source of tritium.

ACCELERATOR COSTS

Senator THURMOND. Dr. Reis, how much will the accelerator demonstration at Los Alamos cost?

Dr. REIS. The accelerator Engineering Development and Demonstration (ED&D) activities, involving primarily the Los Alamos National Laboratory; Westinghouse Savannah River Corporation; Brookhaven National Laboratory; and Lawrence Livermore National Laboratory, will cost about $600M in current-year dollars. A large, fraction of the $600M will be spent to purchase equipment from commercial vendors.

Senator THURMOND. What fraction of the entire tritium production program does this represent?

Dr. REIS. The answer depends upon which option is ultimately selected as the primary tritium production source. If an accelerator facility is built, the $600M estimated cost for accelerator Engineering Development and Demonstration (ED&D) would represent about 14 percent of the total estimated cost of the entire tritium production program. If the Department does not build an accelerator then the accelerator ED&D costs would be a greater fraction of the entire tritium production program. The fractional cost in the later case is also dependent on whether the Department purchases a reactor or irradiation services.

ACCELERATOR

Senator THURMOND. Will it be run as an R&D facility after the tritium production facility decision is made?

Dr. REIS. Currently, there are no long-term plans to continue the operation of the demonstration accelerator facility located at the Los Alamos National Laboratory for other research and development activities. However, some accelerator-related testing activities will continue it the facility after the decision has been made on the primary tritium production source to support engineering design which will be completed even if the reactor option is chosen to be the primary method of production. Engineering design will be completed because only in this way could an accelerator facility be made operational within about 5 years (the period of time supported by the tritium reserve inventory) should it be needed.

TRITIUM RFP

Senator THURMOND. Dr. Reis, please describe the tritium production Request for Proposal (RFP) recently issued by DOE.

Dr. REIS. The Prime Contractor (Prime) will design, construct, and commission the APT plant. The Prime will review and accept the Conceptual Design materials prepared by the Los Alamos APT Office, and prepare the final Conceptual Design packages. The Prime will lead the balance-of-plant design, and will integrate all aspects of the APT plant design. The Prime will develop and maintain the project control system. It will be responsible for system engineering and integration necessary to assure that the APT facility performs as planned. During the construction management phase of the project, the Prime will be responsible for construction management of the plant and management of its contractors. During the operational test and commissioning phase the Prime will lead the commissioning with the assistance of the SRS operator. This latter activity will include training of SRS-operator personnel who will operate the plant, integrated testing of systems, and assurance that the plant meets the accepted specifications for all systems.

Senator THURMOND. Do I understand that this RFP is not simply for the conceptual design of the full sized tritium production accelerator, but for the whole project? If so, does this not tend to unduly limit the range of industrial respondents?

Dr. REIS. Yes, you are correct, the RFP is for the entire project beyond Engineering Development and Demonstration. This approach is consistent with the Department's dual track approach, which entails a 3-year review period of the accelerator and commercial light water reactor approaches. It does not unduly limit the number of acceptable respondents because for cost and schedule efficiency, it is important that a single contractor be able to execute the entire project. Also, the Prime will subcontract much of the work to other companies.

Senator THURMOND. Dr. Reis, do I understand that in the tritium production RFP that you have put the Albuquerque Office and Los Alamos Lab in charge of the technical direction of the entire project, contrary to the guidance in the Conference report that the Savannah River Office be the lead agent for this project?

Dr. REIS. The Accelerator Produced Tritium Project Office is currently staffed by Headquarters, Albuquerque Operations Office (ALO) and Savannah River Operations Office (SRO) employees. This Office is currently administratively managed by ALO, but this responsibility will move to SRO during the design stage of the project should the APT be selected as the primary tritium production source. Because of the close proximity of ALO to Los Alamos, which has lead responsibility for design and test of the prototype low-energy accelerator as well as for engineering design and development of the system, and the proximity of SRO to the Savannah River Site we feel that this is the most efficient way to manage the project.

NUCLEAR PRODUCTION CAPABILITY

Senator THURMOND. Dr. Smith, the Nuclear Posture Review briefings indicate that the U.S. needs to develop distinct plans (1) for maintaining our nuclear weapons at START I levels with appropriate DOE supporting infrastructure, (2) for potentially maintaining our nuclear weapons at START II levels with the appropriate DOE supporting infrastructure, and (3) for maintaining sufficient weapons manufacturing capacity to reconstitute a larger weapons stockpile in the near term should the world situation deteriorate. You have indicated that DOD and DOE are developing detailed plans for the first two. Will you be doing a detailed plan on developing the options to reconstitute U.S. production capacity? When can the Congress see it?

Dr. SMITH. The same document that DOD and DOE are developing to address the START I and START II levels, *the DOE Stockpile Stewardship and Management Program Implementation Plan,* also addresses establishing a baseline production capability, maintaining it, and also the ability to expand its capacity beyond the planned level if needed. Congress will be briefed on the plan once the two Departments have reached concurrence on a final version. I expect that to be later this summer.

QUESTIONS SUBMITTED BY SENATOR DIRK KEMPTHORNE

"NUCLEAR ENERGY" PROJECT

Senator KEMPTHORNE. Mr. Curtis, I see that there is a new line item termed "Nuclear Energy" for $72.2 million in the fiscal year 1997 request. Do I understand that this is for work on reactors in the former Soviet Union, and that the Atomic Energy Defense account is now being asked to pick up the full burden of this project? Can you elaborate?

Mr. CURTIS. $66.2 million of the $72.2 million request is to fund the International Nuclear Safety and Chornobyl Initiative Program which is designed to reduce the national security and nuclear safety threats posed by the operation of Soviet-designed nuclear reactors. The goals of this program are to improve nuclear safety worldwide, particularly the safety of Soviet-designed nuclear power plants; and to secure shutdown of the Chornobyl nuclear power plant.

The remaining $6 million of the $72.2 million request is to fund the Nuclear Security/Russian Production Reactor Shutdown Program which is designed to reduce threats posed by the continued operation of reactors that produce weapons grade plutonium, and to promote management practices that minimize the risks of proliferation of weapons-usable nuclear materials. Specific activities include: preparatory work for conversion of fuel in Russian production reactors such that they will not produce weapons grade plutonium and identifying future options to replace them; expansion of nuclear safety and nonproliferation cooperation with international agencies and foreign countries; addressing safety and nonproliferation concerns associated with breeder reactors in the former Soviet Union; and developing spent fuel management plans not requiring reprocessing for selected countries of the former Soviet Union.

TRANSFER OF PROJECT

Senator KEMPTHORNE. Mr. Curtis, was this a State Department Agency for International Development Project before being transferred to Atomic Energy Defense activities? What mechanism in the administration led to this decision? How do you justify this under the AEDA mission?

Mr. CURTIS. In the years preceding and including fiscal year 1885, the work being done by the International Nuclear Safety and Chornobyl Initiative Program was funded by the U.S. Agency for International Development. While the work was accomplished by the department the funding mechanism was very inefficient. Long periods of time were required to complete transfers of funds and 1 year, due to administrative problems, the Department failed to receive new funding. Congress wisely recognized the inefficiency in the funding arrangement and provided $30 million in the Department of Energy's Other Defense Activities account in fiscal year 1996 to conduct these activities. Congress did not appropriate any funds for the Nuclear Security/Russian Production Reactor Shutdown Program (called Russian Replacement Power Initiatives in the fiscal year 1996 request); however, Senate Report 104–120, page 92, Nuclear Energy Programs stated that it, ". . . would be more appropriately funded under a foreign assistance or national security program." Since the Nuclear Security/Russian Production Reactor Program addresses eliminating the production of weapons grade plutonium at the Russian production reactors and in reducing the risks of proliferation of the weapons material, the Department considered that this program is ". . . a national security program" as specified in the Senate Report. Because Congress directly funded the International Nuclear Safety program in the Atomic Energy Defense Activities (AEDA) account and indicated that the other program would be more appropriately funded under a national security program, senior Departmental officials determined that Congressional guidance was clear. Therefore, the fiscal year 1997 request for both programs was made in the AEDA program area.

INCREASES IN BUDGET

Senator KEMPTHORNE. Ms. Rohlfing, there were significant increases in your budget from fiscal year 1995 to fiscal year 1996. We are now seeing further increases in fiscal year 1997. Can you explain the main projects which require such increases and tell us where you propose to have the work done?

Ms. ROHLFING. The increases in the budget for the Office of Nonproliferation and National Security are primarily focused on two programs: the nuclear materials protection, control and accounting Program and the Industrial Partnering Program. Both of these programs seek to further nonproliferation goals in Russia and the Newly Independent States (NIS).

Materials Protection, Control and Accounting

In fiscal year 1996, the Department of Energy's (DOE) nuclear materials protection, control and accounting (NTC&A) program is working at 35 locations in Russia and the NIS. In the past 6 months, the United States and Russia have added 17 new locations to those scheduled to receive security upgrades. Projects that are underway or planned for fiscal year 1997 under the UTC&A program include:

- Continuation of material security upgrades at Kurchatov Institute, Chelyabinsk–70, Tomsk–7, Arzamas–16, Obninsk IPPE, Mayak, Podolsk, Dmitrovgrad, and the Elektrostal HEU line in Russia; at Aktau, Semey, and Almaty in Kazakstan; at Kharkiv and Kiev in Ukraine; at Sosny in Belarus; and nuclear institutes in Latvia, Lithuania, Uzbekistan and Georgia.
- Begin upgrades at six additional Russian facilities, identified through Gosatomnadzor (GAN) cooperation in October, 1995: Karpov Research and Development Institute of Physics and Chemistry, Petersburg Institute of

Nuclear Research, Dubna; Polytechnic University, Tomsk; and Nikel Combine, Norilsk. Upgrades will also begin at Sevastopol in Ukraine.

- Begin up at six Minatom facilities identified in the Joint Statement on Control, Accounting and Physical Protection of Nuclear Materials signed on January 30, 1996, during the sixth meeting of the Gore-Chernomyrdin Commission: Novosibirsk Chemical Concentrates Plant; Beloyarsk Nuclear Power Plant (NPP); Beloyarsk NPP Sverdlovsk Branch of the Scientific Research and Design Institute of Power Technology; Khlopin Radium Institute; Krasnoyarsk–26; and Sverdlovsk–44.
- Provide equipment and training to GAN in support of development of the MPC&A regulatory base in Russia
- Begin cooperation with the Russian Navy fresh fuel storage facilities to improve MPC&A of naval fuel

The net increase in funding for the MPC&A program in fiscal year 1997 is due to the following: (1) a funding increase in response to the rapid pace of expansion of cooperation with Russian facilities for MPC&A upgrades; and (2) the realignment of funds for program direction and related expenses to a new decision unit. This net increase is important to ensure early safeguarding of weapons-usable material in support of U.S. nonproliferation goals.

Industrial Partnering Program

The Department's principal instrument for securing weapons of mass destruction (WMD) expertise (and removing incentive for Russian scientists to go to rogue countries or assist terrorist groups) is the New Independent States Industrial Partnering Program, or IPP. The objective of IPP is to engage scientists and engineers from weapons institutes of the NIS in peaceful applications of technology, leading to commercial benefits in both the United States and the NIS. The principal goal of the Program is to stabilize personnel and resources in the NIS that represent a proliferation risk. Other programs seek to secure the nuclear weapons and material; IPP seeks to address the incentives facing weapons scientists, engineers, and technicians operating in and around facilities with materials and equipment of concern.

The approach of IPP is three-fold. First, the DOE national laboratories work with the NIS institutes to identify and evaluate the commercial potential of research and development at NIS institutes. Second, approved partnerships are cost-shared by U.S. industry. Finally, the objective is commercialization. The program leverages NIS intellectual capital, provides seed money to speed activity and lessen delay caused by uncertainty, and generates private sector-funded, self-sustaining projects and promote alternative peaceful employment and long-term stability for these individuals of concern.

The funding for the NIS–IPP has been and is projected to be:

- Fiscal year 1994: $35 million in Freedom Support Act funds
- Fiscal year 1995: No additional funds were appropriated; however, fiscal year 1994 funding was received late in the fiscal year and funds were carried over into fiscal year 1995
- Fiscal year 1996: $10 million in DOE funding (plus an additional $10 million in Cooperative Threat Reduction Act funding in process but not yet received)
- Fiscal year 1997: $15 million in DOE funding

Of the $10 million in fiscal year 1996 DOE funding, allocation is as follows:

- $5 million in DOE lab-to-lab agreements with NIS institutes, of which at least half will be obligated as payment to the institutes.
- $1 million for the DOE laboratory operating group supporting IPP.
- $0.8 million program direction.
- $0.8 million for communications and database management.
- $1.9 million for a financial assistance agreement with the University of New Mexico to fund the activities of the U.S. Industry Coalition.
- An additional $10 million in Cooperative Threat Reduction Act funding is in process but has not yet been revived.

Of the $15 million in fiscal year 1997 DOE funding, allocation is as follows:

- $10.5 million in DOE lab-to-lab agreements with NIS institutes, of which at least half will be obligated as payment to the institutes.
- $1 million for the DOE laboratory operating group supporting IPP.
- $0.8 million for program direction.
- $0.8 million for communications and database management.
- $1.9 million for a financial assistance agreement with the University of New Mexico to fund the activities of the U.S. Industry Coalition.

To date, over 200 projects have been initiated—85 percent with institutes in the Russian Federation—including 175 "Lab-to-Lab" projects (Thrust I) and 32 industry cost-shared projects (Thrust II). Of the latter projects, DOE's $12 million has bee matched by $24 million from the private sector. Projects have engaged over 2,000 weapons scientists and engineers on projects ranging from materials science, to biotechnology, to instrumentation, to materials protection, control and accountability, and so on. IPP is an investment in U.S. national security. While we cannot solve the expertise and technology proliferation problem in the NIS alone, DOE and the technology base at its national laboratories can help solve it.

The nuclear materials protection, control and accounting program and the Industrial Partnering Program have both made considerable progress in reducing the global nuclear danger. The requested funding increases in fiscal year 1997 will enable these programs to build upon their success to date and further this critical work over the next fiscal year.

WEAPONS REBUILDS

Senator KEMPTHORNE. Mr. Curtis and Dr. Reis, when will you have the capability to rebuild every type of weapon in the enduring stockpile?

Mr. CURTIS and Dr. REIS. DOE builds components for the maintenance and refurbishment of all U.S. nuclear weapons at its four production sites and at the Los Alamos and the Sandia National Laboratories. These components are assembled into nuclear weapons at the Pantex Plant. Most components (the notable exception being plutonium pits and secondaries) can be produced today, and the capability will be maintained during plant downsizing. As stated in the Draft PEIS for Stockpile Stewardship and Management (SS&M PEIS), the preferred alternative for pit production is to upgrade the TA–55 facility at Los Alamos. The Record of Decision (ROD) for the SS&M PEIS is scheduled for August 1996. Regardless of the outcome of the ROD, a limited plutonium pit production capability will be demonstrated at Los Alamos in fiscal year 1998. If LANL is chosen for pit production as a result of the ROD, a larger capacity (50–80 new pits per year) will be in place by fiscal year 2003. With regard to secondaries, the Y–12 Plant is expected to resume full-scale enriched uranium operations in fiscal year 1999. Production capability for a few components, such as neutron generators, is in the process of being reestablished at new sites, after the closure of production operations at Mound, Pinellas, and Rocky Flats at the end of fiscal year 1994. All of these relocated capabilities are coming on-line on schedules that continue to support stockpile needs.

Senator KEMPTHORNE. What will be the rebuild capacity and where will the work be done?

Mr. CURTIS and Dr. REIS. Our base case for a rebuild capacity is a START II stockpile size. A summary of the preferred alternatives for each weapons area, as expressed in the draft Stockpile Management Preferred Alternatives Report, dated February 1996, for the base case is set forth below. [No decisions will be made until completion of the Stockpile Stewardship and Management Programmatic EIS.]

Area of interest	Preferred location	Base case START II
Pit Fabrication [1]	LANL	50 new pits per year (single shift)
Secondary Fabrication	Y–12 Plant	50 sets of components per year
High Explosives Production	No preferred location (LANL, LLNL, or Pantex).	150 component sets per year
Nonnuclear Component Fabrication [2]	Kansas City Plant	As high as 300 field/factory retrofits sets per year
Weapons Assembly	Pantex Plant	260 weapons per year

[1] During weapon refurbishment to replace other components, most pits are expected to be requalified and reused.

[2] Excludes work now done at National Laboratories.

Senator KEMPTHORNE. How long from that point would it take to achieve a higher build rate should we have to reconstitute the stockpile? Do you have an estimate of the annual build rate for reconstitution and when could that capacity be achieved?

Mr. CURTIS and Dr. REIS. Once the production capability of the nuclear weapons complex per the base case shown earlier is in place, achieving higher build rates consistent with the hedge strategy is possible. Expanding base case capacities is possible within a year with increased personnel or within a few years if construction is necessary, depending on the level of new capacity required. The table below shows that capacity.

In addition, the DOE and DOD are working together to plan for reactivation and reconstitution of the stockpile, rather than building entirely new weapons. Select weapons in the Inactive Stockpile, designated for augmentation purposes, would be supplied with components (typically filled tritium reservoirs) and deployed in the Active Stockpile. This is consistent with the President's "lead and hedge" policy, and allows for maximum flexibility in supporting the START I and START II stockpile levels.

Area of interest	Preferred location	Hedge capacity (START I)
Pit Fabrication[1]	LANL	80 pits per year (multiple shifts)
Secondary Fabrication	Y–12 Plant	100 sets of components per year (maintain capability for an additional 200 sets in cold standby)
High Explosives Production	No preferred location (LANL, LLNL, or Pantex).	300 component sets per year
Nonnuclear Component Fabrication[2]	Kansas City Plant	As high as 600 field/factory retrofits sets per year
Weapons Assembly	Pantex Plant	As high as 440 weapons per year (includes surveillance)

[1] During weapon refurbishment to replace other components, most pits are expected to be requalified and reused.

[2] Excludes work now done at National Laboratories.

STOCKPILE REQUIREMENTS

Senator KEMPTHORNE. Would each of the members of the panel please describe their most pressing immediate need to meet the requirements of the U.S. nuclear weapons stockpile?

Mr. CURTIS, Ms. ROHLFING, and Dr. REIS. The DOE fully intends to meet the requirements of the President's nuclear weapons guidance. Pit fabrication, both to replace pits destructively tested as part of the surveillance program and to maintain the capability as directed by the President, is the most immediate pressing need to meet requirements. The Los Alamos National Laboratory (LANL) is the preferred alternative for new pit production. The Record of Decision for the Stockpile Stewardship and Management Programmatic Environmental Impact Statement is expected in late summer of 1996. Under the preferred alternative, plutonium fabrication operations would be fully functional at LANL in fiscal year 2003, with a sufficient capacity of about 50 new pits per year in single shift operations and up to 80 new pits when operating multiple shifts. Smaller levels of production, as the full capacity is being established, would be available in time to meet all requirements.

New tritium production is another significant requirement of the U.S. nuclear weapons stockpile. The Department's dual track approach will allow us to meet new tritium production requirements—fiscal year 2011 (lead) or fiscal year 2005 (hedge) as reflected in the recently signed Nuclear Weapons Stockpile Memorandum.

FISCAL YEAR 1996/1997 BUDGET

Senator KEMPTHORNE. Are your fiscal year 1996 and fiscal year 1997 budgets sufficient to meet the near term requirements?

Mr. CURTIS and Dr. REIS. The fiscal year 1996 budget and the fiscal year 1997 $3.7 billion budget request for Weapons Activities are adequate to meet the near term requirements as outlined by the President. As you know, the President has recently signed the Nuclear Weapon Stockpile Memorandum which sets firm requirements for the stockpile stewardship and management workload for the near term, including a new tritium source. In addition, the fiscal year 1997 budget supports key initiatives in the transition to science-based Stockpile Stewardship for the future without underground nuclear testing as envisioned in the zero-yield Comprehensive Test Ban Treaty. Finally, the budget supports sufficient safeguards to permit our nation to resume underground testing if directed, support emergency response capabilities, and reconstitute weapons production capabilities, if necessary.

Senator KEMPTHORNE. Would each of the members of the panel please describe their most pressing immediate need to meet the requirements of the U.S. nuclear weapons stockpile? Are your fiscal year 1996 and fiscal year 1997 budgets sufficient to meet these near term requirements?

Ms. CLEGG. Our most pressing need at the Kansas City Plant is funding: funding sufficient for the workload in fiscal year 1997, recapitalization to keep abreast with emerging manufacturing technology, and the maintenance of the skill base of our technical and production labor staff. Currently our plant is very capable with respect to current manufacturing technology. In the past, weapon line item funding allowed us to improve, update, and replace our manufacturing equipment assets base continuously. Today, funding for manufacturing capital improvements is very limited and our capability will begin to degrade rapidly if action is not taken to reverse this trend. We estimate that approximately $8 to $10 million per year will be required to maintain parity with American industry and the new manufacturing technologies being developed by our technical staff and the national laboratories. Such an investment over the next 7 to 10 years will ensure that the capability of our plant will remain viable. Additionally, process development endeavors must continue to be funded to maintain our technical skills base and keep pace with changing technology. Finally, stability is necessary. Our human resources have been significantly impacted by downsizing over the past 5 years and could decrease by another 1000 associates as the result of our proposal for the recent SSNTEIS. Providing some certainty of the future mission for the production plants and a level of funding sufficient for the workload that will allow 5 to 10 years of confidence for our associates is critical. We must downsize, but to be cost effective we must have modem equipment and the best work force available. A stable view of the future for the nuclear weapons complex will help get this job done.

Our fiscal year 1996 Core Stockpile Management budget is sufficient with respect to our directive workload. We have identified approximately $11.7 million of unfunded workload for fiscal year 1997. Without action to address this shortfall, and with an even more significant level of unfunded effort in fiscal year 1998, the Kansas City Plant will be forced to defer critical mission assignments.

Mr. GUSTAVSON. The paradigm still exists in this world of decreasing budgets that additional requirements can continue to be absorbed within existing resources. That simply is no longer the case; resources both fiscal and personnel are significantly changed within the complex. Over recent years, this situation has resulted in many short-term decisions that could have long-term implications on the future of the nuclear weapons complex. Little new capital funding has been available to ensure that the base infrastructure of the production sites is maintained at a satisfactory level. Operations need to be maintained in a state that remains ready to meet mission-related requirements.

The fact has been recognized within the laboratory community, it also applies across the production complex as well; there must be challenging work to attract talented young professionals who would become the experts for the future.

Immediate needs exist to augment the professional staffs at the production sites both from the personnel perspective as well as ensuring the infrastructure needs are maintained. Budget requirements for both fiscal year 1996 and fiscal year 1997 meet the basic hardware deliverables, but do not allow us to significantly improve our stockpile management.

Dr. WEINRICH. The most pressing need is to keep infrastructures and facilities that support production plant operational activities adequate, modem and well-maintained. New technologies and better management practices also demand regular upgrading of systems, practices and facilities to assure safety, quality and efficiency. Caring for an aging stockpile introduces more variables and suggests it is prudent to maintain the most modem facilities, systems, and technologies to respond to the changing requirements.

The fiscal year 1996 budget with the additional Defense Appropriations Bill funding of $17,000,000 for plant upgrades and modernization (which has not been received at Pantex) is sufficient for meeting our 1996 mission. The fiscal year 1997 budget target was reduced in February 1996 by $16,800,000. The short fall adversely affects our Production Capability Assurance Program (PCAP), the program that sustains our core competency; general environmental, safety and health activities; facility maintenance; and facility capability upgrades.

Mr. TARTER. To answer the second part of your question first, the fiscal year 1997 budget for Weapons Activities is a very tight budget, as is the fiscal year 1996 budget. The Stockpile Stewardship and Management Program, as supported by the President, requires an investment on the order of $4 billion per year for a decade. These funds are necessary to construct essential experimental facilities and to develop vital surveillance, revalidation, and remanufacturing capabilities to ensure the safety and reliability of the nuclear stockpile—both in the near term and as weapons grow even older.

An investment of $3.7 billion in fiscal year 1997 is a barely adequate start to the Stockpile Stewardship and Management Program. I emphasized in my oral testimony the necessity of a $4 billion per year average for a decade. More money sooner would allow us to bring on line more rapidly the tools we need to maintain the stockpile in the absence of nuclear testing. By not beginning with a stronger start, we are increasing the risk that the Program will fall short of its objectives. It forces us to make very difficult tradeoffs among competing stewardship and management needs.

The Stockpile Stewardship and Management Program is a highly integrated effort aimed at both meeting near-term stockpile needs and developing capabilities and facilities that will be increasingly necessary as the stockpile continues to age. Both sets of activities are important. My answer to the next question about targeted areas for additional funding in fiscal year 1997 provides some indication of which are the most pressing immediate stockpile stewardship needs.

Dr. HECKER. As I stated in my written testimony, in developing the stockpile stewardship and management plan at the time of the President's decision to seek a zero-yield Comprehensive Test Ban Treaty (CTBT), we identified the need for a $4 billion budget for the Department of Energy (DOE) Defense Programs for fiscal year 1997, increasing slightly for close to 10 years, before decreasing to a steady state of approximately $3 billion in the out years. Thus I do not believe that the $3.7 billion level is adequate. The need for new capabilities to accomplish the difficult job of science-based stockpile stewardship, exacerbated by the deteriorated condition of many of the existing facilities needed for this mission requires a significant investment, one that will be made greater by delays.

FISCAL YEAR 1997 BUDGET INCREASE

Senator KEMPTHORNE. If each of you had 10 percent more resources in fiscal year 1997, what nuclear weapons related tasks would you do that you cannot do now?

Mr. CURTIS, Dr. REIS, and Ms. ROHLFING. If additional resources above the budget request were made available, we would generally enhance activities already underway rather than initiate new programs. The highest priority would he to accelerate selected tritium activities from fiscal year 1998 and beyond to fiscal year 1997 in support of the anticipated 1998 Secretarial decision on the "primary" approach for tritium production. About $60 million in activities currently scheduled for fiscal year 1998 and beyond could be moved forward in support of the dual track. About 25 percent of this funding would support the commercial light water reactor track and the remainder would support the accelerator. The benefit of accelerating these activities would be to improve the knowledge base for the acquisition process and lead test assembly activities. for the CLWR option, and improve the conceptual design baseline for the accelerator and extraction facility.

Other activities that could be enhanced or accelerated include support for high performance computing in the stewardship core program (an additional $30 million); enhanced surveillance activities at both the production plants and the laboratories (an additional $35 million); additional funding for the ASCI program (an additional $75 million) and fundamental simulation and modeling activities in physics, materials and engineering within the stewardship core (an additional $12 million); advanced manufacturing in preparation for the anticipated ADAPT initiative in fiscal year 1998 (an additional $40 million); advanced hydrodynamics research and development (an additional $20 million); and, weapons baselining and experimentation at the Nevada Test Site (an additional $20 million).

An additional $50 million funding could be used to accelerate and address the Defense Programs long-range strategy for production facility utilization as outlined in the Draft Stockpile Stewardship and Management Programmatic Environmental Impact Statement. These activities will be carried out through or in support of the Stockpile Management, Restructuring Initiative (SMRI). Specific activities would include: (1) completion of conceptual design reports initiated in fiscal year 1996; (2) prebuild of component inventories as needed to meet stockpile requirements during transition, (3) acceleration of existing construction projects that are still required in the downsized complex; (4) accelerating the incorporation of advanced or alternate processing technologies into the downsized complex; (5) enhancing capital equipment and general plant project funding aimed at reducing maintenance costs, replacing aging technology, increasing productivity, upgrading automation and reducing scrap rates; (6) acceleration of the transfer of inventories, documentation, tooling, gauges and test equipment from donor sites to receiver sites; and (7) other facility planning and transition activities ($50 million).

Dr. HECKER. Let me first state that we know that both the plants and the laboratories have needs that require additional funds. The additions that I discuss below for the use of the 10 percent additional resources in your question include the plants in cases where as a laboratory we best understand their activities. Those activities, of course, are the ones where the laboratories are the most directly engaged with the plants. The plants most likely have additional needs that are best articulated by them in response to your question. But I have attempted to address some of their needs.

Since the current DP budget proposal in the President's budget is $3.7 billion, 10 percent would be $370 million. Below is a table of the ways that I believe $370 million in the DOE Defense Programs account could best be used. This table is based on my assessment that under the current $3.7 billion funding level for DP, the core functions and the deliverables to DOD are insufficient. The proposed increases accomplish the needed rebalancing.

Stockpile Stewardship:	
Enhanced Surveillance ($25M at labs + $20M at plants)	$45M
Computing and Modeling (ASCI + $25M, Codes and Algorithms + $20M, Modeling & Simulation + $25M)	$70M
LANSCE enhancement	$3M
Stockpile issues (W–87, B–61–11, Baselining, Dual Revalidation, Pu, experiments at NTS)	$42M
Advanced Radiography	$20M
ADaPT/TTI/Science Education	$50M
Facility revitalization ($5M fast start) and Pu inventory stabilization (3M)	$8M
Stockpile Management:	
Tritium (Superconductivity and APT)	$62M
Pu pit production (faster track)	$20M
Enriched uranium at Y–12	$20M
ADaPT	$30M
Total	$370M

Nonproliferation and National Security

In the non-proliferation and national security account, I believe the 10 percent increase from your questions should be focused on three accounts: Research and Development, Intelligence, and Safeguards and Security. In the President's budget the non-proliferation and verification R&D line is cut by almost $16 million for a 7.5 percent reduction. I would place a substantial amount of the 10 percent increase in this account. This should be used both for the development of new instruments, technologies, and approaches, and for R&D developments related to the NBC initiative that was discussed at the May 13 hearing. The increased threat of nuclear, biological and chemical terrorism as well as weapons threats in these areas requires an additional national commitment of resources and attention. In addition, the intelligence basis for understanding specifically which threats are the greatest needs enhancement. These assessments are vital to focusing the R&D efforts and should receive increased attention. And I would apply a few n-dllion dollars to increasing the activities of the nuclear safeguard and security efforts.

Below is a table regarding how the funds would be allocated. The current funding level for the non-proliferation and national security account is $586.9 million. Therefore, I have allocated $58 million to these three lines.

Non-Proliferation and Verification R&D	$45M
Intelligence	$10M
Safeguards and Security	$3M
Total	$58M

Defense Environmental Restoration and Waste Management

The budget request for fiscal year 1997 is $5.4 billion. I do not believe that I can provide sufficient knowledge about the entire DOE complex to give you useful guidance as to how to add $540 million to this account. But I do have some specific comments that may be useful.

If there is a substantial increase in funding for the Environmental Restoration and Waste Management account, Los Alamos badly needs an increase of at least $11 million in order to enable implementation of environmental stewardship activities that would eliminate waste streams in current program activities in order to help those programs generating such waste as they prepare to assume ownership of waste activities and costs in 1999. I also believe additional funds could be very useful in the EM Science program that is designed to develop new innovative technologies that will be useful in reducing costs in the future. This program is managed by the Office of Energy Research in DOE with coordination with EM. In addition, we recommend that the EM Waste Minimization program be increased from $12.4 million to $30 million in order to stimulate DOE-wide pollution prevention programs.

Fissile Materials Control and Disposition

This is currently listed in the President's budget submission for fiscal year 1997 at $93.7 million. I believe your 10 percent increase ($9M) could be very useful in accelerating the validation of disposition technology options currently under consideration, such as the technology for converting plutonium to unclassified forms, which is called the Advanced Recovery and Integrated Extraction System (ARIES). We also believe some of the $9 million increase could be useful in furthering the Lab-to-Lab activities that are designed to close the window of vulnerability on nuclear materials issues in the former Soviet Union. We recognize that at some point Russia and the other independent states will be able to fully manage their nuclear materials, but there continues to exists a "window of vulnerability," and it is in the nation's national security interest to assist the Russians in closing this as soon as possible.

Worker and Community Transition

A 10 percent increase in this funding line is also justifiable. There is a substantial reduction in this account compared to fiscal year 1996. Yet many sites will continue to need to reduce workforce levels both as a result of budget cuts and as efforts to implement greater efficiencies at DOE sites continue. At Los Alamos, for example, we anticipate further voluntary separation programs, and funding from the Department of Energy is essential to that process going as smoothly as possible. A 10 percent increase would be $6 million and is definitely needed.

Dr. ROBINSON. The Sandia Defense Programs budget is currently slated to decrease by $50 million from fiscal year 1996 to fiscal year 1997. The actual fiscal year 1997 shortfall is somewhat obscured by new component production requirements that Sandia has been assigned. We are being asked to purchase additional thermal batteries and electronic components out of our Stockpile Management budget. This new expense diminishes resources normally used to support our stockpile maintenance activities.

We have a $6.5 million shortfall in fiscal year 1996 in our Stockpile Management budget to cover a pre-buy of NMCs (monolithic microwave integrated circuits) for the W88 Trident D–5 SLBM warhead.

We have a $12 million shortfall in the fiscal year 1997 Stockpile Management budget to cover additional component procurements and production activities above and beyond our fiscal year 1997 target levels.

We have a $50 million shortfall in the remainder of the Sandia Defense Programs budget in fiscal year 1997. These activities would fall into the Stockpile Stewardship or Manacement budget depending on congressional decisions regarding where, whether, and at what level to fund activities such as Enhanced Surveillance and ADAPT (DOE's program for Advanced Design and Production Technologies). Activities that would be funded with this $50 million include:

- **Enhanced Surveillance.** The current Sandia fiscal year 1997 budget for Enhanced Surveillance is $10 million. For an additional $6 million we would work with Pantex to provide corroboration for materials and component aging models being developed as part of the currently funded Enhanced Surveillance Program.
- **Dual Revalidation and the Warhead Protection Program.** These are new requirements from DOD that are currently under-funded in fiscal year 1997. The Warhead Protection Program will serve as a means for developing and validating new product design and production technologies. These programs are directed at recertifying current designs and providing replacement options for the aging W76 SLBM warhead, and they cannot be fully accommodated within the reduced Sandia fiscal year 1997 budget. An additional $10 million is required to begin to address the full range of options in the Warhead Protection Program in fiscal year 1997.
- **Radiation-hardened microelectronics.** We are in danger of losing our capability to produce microelectronics that are resistant to radiation effects at the Sandia Microelectronics Development Laboratory (MDL). We have a shortfall of $12 million to support research in semiconductor processing of radiation-hardened microelectronics, as well as a $7 million shortfall to cover infrastructure costs for the Microelectronics Development Laboratory. The two remaining U.S. suppliers of radiation-hardened microelectronics (Honeywell and Loral) are being supported by DOD subsidies. Even with subsidies, these suppliers are questioning whether they will stay in the radiation-hardened microelectronics business, given the expense of maintaining their fabrication facilities and the small size of the market for radiation-hardened integrated circuits (less than 0.1 percent of the total market for integrated circuits, and falling).
- **Electronic information system.** This system ($5 million) would capture and preserve nuclear weapons knowledge in an electronic format, accessible using multi-level security options. This knowledge includes: product and process design data, records of assembly, product test data (both underground and environmental test data), stockpile evaluation data (laboratory

and flight tests), and engineering procedures. The data currently reside in a wide variety of formats that are aging and may be inaccessible in the near future using commercially available technologies.

- **Additional support for Sandia's pulsed power activities.** Sandia has supported the proposed National Ignition Facility through our program in inertial confinement fusion (ICF), radiography through experiments with Los Alamos National Laboratory on the Sandia Accelerator and Beam Research Experiment (SABRE) facility, and weapon physics experiments with both Lawrence Livermore and Los Alamos national laboratories on Sandia's Saturn pulsed power machine. Future experiments on Sandia's Hermes IIII gamma-ray accelerator will be directed at providing DOE with a proof of principle for a low cost radiography technique that may be used to validate primary implosion codes. If this technology is validated, construction cost savings on the Los Alamos dual-axis radiographic hydrodynamic testing (DARHT) facility second axis are estimated at $80 million. An additional $5 million will support these tri-lab efforts at Sandia facilities.
- **Critical non-nuclear component testing facilities.** These facilities need to be consolidated for a significant reduction in overall operating cost. They are essential for certification and safety assessment of weapon components in both normal (stockpile-to-target sequence) and abnormal (e.g., fire, crush, impact, lightning strike) operating environments. This consolidation will require $5 million in fiscal year 1997.

The plus-ups outlined above contain $27 million that could be funded as part of DOE's program for Advanced Design and Production Technologies (ADAPT) if it were reinstated in the Defense Programs budget. These activities include: processing of radiation-hardened microelectronics, applying advanced design and production technologies to a W76 recertification and/or redesign program, and implementing the electronic information system for our nuclear weapons knowledge base, past, present, and future.

Mr. GUSTAVSON. Modernize and upgrade weapons manufacturing and production equipment within the reduced footprint proposed by the SSM PEIS. In addition, Y–12 would accelerate the relocation of quality evaluation and acquire new glove box capability to support stockpile surveillance in a more cost-effective manner.

Dr. WEINRICH. Ten percent more resources in fiscal year 1997 would provide funds for the programs and activities mentioned in question 5. Generally, our challenge is to consolidate our activities into our most modem facilities while assuring we upgrade according to operational necessity and preserve the physical condition of these modem facilities. Good maintenance practices requires capital investment each year to prevent erosion of plant resources.

Ms. CLEGG. Funding guidance from the DOE for fiscal year 1997 is approximately $12M less than required to complete our workload. A 10 percent increase in our Core Stockpile Management budget would allow us to perform all of our directive workload and to recapitalize approximately $10 million of needed computer, processing and analytical equipment.

Mr. TARTER. As I have indicated, the Stockpile Stewardship and Management Program is a highly integrated effort. It is only as strong as its weakest link, and we cannot afford to under invest in any of its major elements. Program balance is very important. Consequently, additional funding in fiscal year 1997 should be invested in a balanced way, but particularly targeted at those areas which could greatly benefit from more resources early in the overall program. Up front investments in selected areas allow us to phase in newly developed tools and capabilities more quickly, which would help minimize the risks to national security posed by the aging of the nuclear weapons stockpile.

With a 10 percent increase in program funding this year, I would recommend providing a substantial boost in support to Stockpile Life Extension and Enhanced Surveillance activities. The Life Extension investments are directed at important, warhead-specific maintenance projects and the Enhanced Surveillance investments will increase our greater capability to detect potential problems early and provide adequate time for reanalysis and action, if necessary. Additional funding should also be directed at Dual Revalidation, Advanced Manufacturing, the Accelerated Strategic Computing Initiative, the Inertial Confinement Fusion Base Program, and DARHT construction. I would be pleased to provide more specific information about these recommendations and the associated incremental benefits if needed.

MOX TESTING

Senator KEMPTHORNE. Secretary Curtis, I very much appreciate your response to my recent letter regarding the benefits of testing MOX fuel in U.S. test reactors.

In your response you state DOE may test MOX fuels in the Candu reactors to assess their unique capabilities. Would you support legislation requiring all MOX testing in U.S. reactors unless unique capabilities were not available in the United States.

Mr. CURTIS. The Department would not consider such legislation necessary since it is DOE's intention to utilize domestic test facilities for light water reactor mixed oxide fuel irradiation testing, where appropriate. However, some foreign testing might be appropriate. For example, the CANDU reactor option will require irradiation testing to confirm its viability in a reactor which duplicates the heavy water reactor environment the fuel would experience in the CANDU reactors. Although it may be possible to simulate the heavy water environment and operating conditions in a domestic test reactor, it would be costly and require extensive modifications that would only be used for limited testing. The Canadian NRU test reactor is already properly configured for such testing. Therefore, the Department should not be prohibited from testing CANDU fuel at the Canadian facility.

CHEMICAL WEAPONS DESTRUCTION

Senator KEMPTHORNE. Dr. Smith, are you concerned that the Army's failure to move forward rapidly with plans to dispose of chemical weapons may lead to serious problems with some of the aging weapons? In your view, are deteriorating weapons a bigger health concern than the incineration technology?

Dr. SMITH. I am satisfied that the Army has exercised prudent judgment in evaluating viable options for disposal of the chemical weapons stockpile. We are convinced that the baseline incineration technology is the safest, most efficient method of disposal now available. We will continue to investigate alternative technologies, although we will do so in conjunction with ongoing disposal using the incineration process. The National Academy of Sciences has determined that incineration of the Chemical Weapons poses less risk than prolonged storage. It is in recognition of this assessment that we intend to proceed with destruction as expeditiously as possible. I should emphasize, however, that our guiding principles remain safety of personnel and protection of the environment throughout the destruction process.

TECHNOLOGY DEVELOPMENT

Senator KEMPTHORNE. Secretary Curtis, what technologies need to be developed and tested in order to implement a program of burning MOX fuels in domestic light water reactors? What is the timetable for developing these technologies?

Mr. CURTIS. The technologies which need to be developed and tested for use of mixed oxide fuels in domestic light water reactors are technologies for the fabrication of the fuel and the performance of the fuel in a reactor. For fuel fabrication, development is required of technologies for extracting and converting plutonium from its existing forms to plutonium oxide powders and also for the fabrication and quality of mixed oxide fuel derived from weapons plutonium. Development is also required to demonstrate that mixed oxide fuels derived from weapons sources behave in a manner that would be satisfactory and similar to the performance for mixed oxide fuels derived from recycled plutonium.

Plutonium extraction from weapons components and plutonium conversion technology, which is required for all of the plutonium disposition alternatives, is being tested in an integrated prototype at Los Alamos National Laboratory in fiscal years 1996 and 1997 and fuel fabrication testing is being done in conjunction with fuel irradiation testing. Beginning later this calendar year, if reactor disposition is selected in the Record of Decision, additional confirmatory testing would be required of the specific fuel design following the selection of the specific reactors. The design and fabrication of test fuel assemblies would require approximately 1 year, followed by a 2 to 3 year irradiation test campaign of the test fuel assemblies.

In addition to burning MOX fuels in reactors, the United States is considering a number of technologies for disposing of surplus weapons plutonium including immobilization in glass or ceramic forms and deep geologic disposal. The Department of Energy is currently evaluating the environmental, technical, cost and schedule aspects associated with these options and is planning to conduct a separate nonproliferation study of the various disposition technologies. A Record of Decision for the long-term storage of all weapons-usable fissile materials and technologies and systems for the disposition of surplus plutonium is planned for late 1996.

INEL SURETY PROGRAM

Senator KEMPTHORNE. Dr. Reis, I understand in fiscal year 1996 you will begin a surety program at the INEL to improve environmental considerations in the future stockpile management program. Will you request funds for this program in your fiscal year 1997 budget request?

Dr. REIS. No funds have been requested in the fiscal year 1997 budget. At this time, this project is expected to be a 1-year effort at an estimated cost of $1 million. Upon evaluation of the deliverables, expected by the end of September 1996, a decision will be made as to whether additional efforts are necessary.

FINAL ENVIRONMENTAL ASSESSMENT

Senator KEMPTHORNE. Secretary Curtis, will the final Environmental Assessment on the electrometallurgical program be released this March as you previously indicated in a letter to me? Do you agree the public comments from the opponents of the program have focused on policy issues instead of environmental impacts?

Mr. CURTIS. The Environmental Assessment for the Electrometallurgical Treatment Research and Demonstration Project in the Fuel Conditioning Facility at Argonne National Laboratory-West was completed on May 15, 1996, as promised by the Secretary, and a Finding of No Significant Impact was issued on that date. The public comment period closed on May 3, 1996. Over 400 comments were received from approximately 75 commentors. Each comment was addressed individually in our comment response document. The public comments addressed a range of issues, including environmental impacts, technical concerns, and policy issues.

SUCCESS OF STOCKPILE STEWARDSHIP

Senator KEMPTHORNE. Taken together, these factors suggest that it may take a decade or even longer to build considerable confidence that stockpile stewardship can meet demanding challenges. It will also be about a decade until the completion of construction of the Advanced Hydrodynamic Testing Facility. That event reasonably could mark the point in time when the long-term Stockpile Stewardship and Management Program becomes "fully operational."

Would each of the weapons laboratory directors describe how long it will take to arrive at a point where we will know whether stockpile stewardship will work, at the present stockpile stewardship funding rates? How long until it would be fully operational under the same assumption?

Dr. TARTER. Right now our confidence in the reliability and safety of the nuclear stockpile is very high. The key issue is whether we can maintain high confidence in stockpile performance as these weapons continue to age beyond their planned lifetimes. There will be much greater demands on the program as weapons age and we lose our experience base through retirements. We believe we can maintain confidence with the Stockpile Stewardship and Management Program.

Confidence that stockpile stewardship can meet the long-term demands on the program will grow as we gain experience in exercising various aspects of stewardship. That will take time. There are at least three significant pacing factors. First, successful long-term stewardship will depend on enhanced surveillance capabilities that we are in the process of developing, on high fidelity 3D physics simulation models that we do not yet have, and on experimental facilities that are just entering the construction phase. Second, stewardship will go through a severe test when a problem develops in the stockpile that demands a major remanufacturing effort and raises difficult recertification issues. It is uncertain when that challenge will arise. Third, program success depends on passing skills and knowledge to future generations of stockpile stewards. We need to monitor how well that process is working.

Dr. HECKER. Director of the Los Alamos National Laboratory, as stated during the hearing, and reflected in the hearing transcript pages 114 and 115.

Let me try to augment the comments of my colleagues by saying the following. We have not tested for 3½ years now, essentially, and with no testing, the confidence declines, but I think quite gradually.

The new tools which you have mentioned already and that we have mentioned in the past will take some time to really develop and come into full fruition.

However, what really helps us in the short term is the fact that the weapons that we have in the stockpile have a good pedigree of nuclear tests and the people who designed them and who engineered them are either still at the laboratories or still alive.

That is why we are able to come back and say to you that we say today the stockpile, the ones we designed, are safe, secure, and reliable. So what we have is, while we have these folks around, we want to make sure that we get these new tools. It is not just the additional computing, but it is the things that I mentioned earlier—more assessment of the stockpile, the enhanced surveillance techniques to make sure that we get some experience with re manufacturing and that we can validate that, as newly manufactured, these weapons are going to be able to do the job.

I think because of that, we will never see a great step fending that we'll say aha, today we've got it. We gradually lose confidence because the people won't be there anymore, but we'll build up the new tools. As I referred in my testimony, I was concerned to make sure that we make the right investment in fiscal year 1997 that that transition is a smooth one.

- *Assembly Facility Humidity Control*—Weapon component assembly requires reliable humidity control at low levels of humidity. Containment/support structures for existing atmosphere control equipment and duct work should be upgraded or replaced.
- *HEU Chemical Recovery Equipment*—Equipment required for processing nitric acid based solids and solutions has not been upgraded since the early 1970s; this includes slag dissolvers, oxide dissolvers, hood exhausts, furnaces, chemical extraction columns, steam evaporators, and area ventilation. Modernization of this equipment through upgrades/replacements is essential to respond to Weapons Stockpile Management initiatives.

In the area of modernization of the plant's physical infrastructure, the following summary of functional capital investment requirements is provided:

- *Utility Plant and Distribution System*— Modernization/optimization of such critical utilities support systems as the steam distribution system and industrial gas distribution systems, as well as, activities to address ES&H initiatives such as storm water pollution control.
- *Facility Life Cycle Replacements*—Many of the manufacturing support facilities have reached the end of their economic and functional useful life. As downsizing occurs, a key aspect of consolidation of operations should be the replacement of these obsolete facilities.

Modernization of the manufacturing processes also requires a program to ensure the availability of a trained, skilled work force that is responsive to advances in technological aspects of the manufacturing processes.

As the Department of Energy plans and implements its Capital Program, it is imperative that currently approved ongoing and planned projects are completed, as well as, completing those newly defined projects in support of the Stockpile Management Restructuring Initiative. There is apprehension at the production plants that the large capital requirements for stockpile stewardship initiatives will necessitate reprogramming of critical capital funding away from the production plants.

Dr. ROBINSON. The Sandia stockpile stewardship strategy is based on developing advanced design and production technologies to reduce the cost of providing the nonnuclear components for the Stockpile Life Extension Program. We are also participating in the Accelerated Strategic Computing Initiative (ASCI), not only to reduce our reliance on testing, but also to enhance our capability to predict stockpile aging and reduce the cost of weapon reconstitution when the weapons must ultimately be replaced. Our current projections are for full operation by fiscal year 2002. These projections are based on level funding (with inflation adjustments) in the overall Sandia Defense Programs budget throughout this period. It is also assumed that new funding will be furnished for any additional production requirements. Fiscal year 1997 funding reductions have made these assumptions uncertain. Nevertheless, we believe that we must be fully operational by 2002 in order to begin the extensive design and qualification activities required for component replacements in the Systems Life Extension Program in this time frame.

Senator KEMPTHORNE. Would each of the four production plant directors outline how you would modernize your respective facilities to meet the requirements of the Nuclear Posture Review?

Mr. GUSTAVSON. In order to ensure the long-term viability of the Y–12 Plant to respond to the requirements of the Weapon Stockpile Management initiatives, a clearly defined and continuing modernization program is essential. Such a program should address both the capital investment and operational resource requirements to assure capabilities and cost effectiveness in the manufacturing processes, backed by site facilities and supporting utilities systems.

In the area of modernization of manufacturing processes, the following is a summary of the functional capital investment requirements:

- *Process Electrical/Control Systems*—Upgrade/replace process and equipment control systems and electrical services. Computer controls, numerical control tape systems, and mechanical controls will be replaced. Precision multi-axis machining and measurement equipment will be refitted with modern controllers, which will keep these machines in a "best of class" condition through the next decade.
- *Mechanical Production and Process Systems*—Upgrade the production and process support systems required for enriched and depleted uranium mechanical manufacturing. Includes vacuum systems, hydraulic systems,

utilities distribution, HEPA filters, ventilation, salt baths, and preventive maintenance diagnostics.

Ms. CLEGG. The Kansas City Plant would apply existing capital funding, already approved construction activities, and an additional $8 to $10 million to systematically upgrade selected computer resources, production processing equipment, and analytical laboratory equipment to leading edge industry standards. Guidance from the DOE at the onset of the SSMPEIS study strongly suggested a consolidation of current manufacturing capabilities rather than establishing new technological capabilities. The resulting proposal, known as "KCP II," was selected as the preferred alternative for nonnuclear production by the Secretary of Energy in February 1996 and is scheduled to be solidified with a Record of Decision (ROD) in late summer 1996. To upgrade current technologies, replace aging processing equipment, and invest in information systems upgrades to maintain compatibility with national laboratory advancements, in parallel to KCP II downsizing, will require an additional investment of $8 to $10 million per year through fiscal year 2003. Without these actions, KCP II will provide a low risk, very cost effective and efficient source of nonnuclear components, but will use today's technologies and will rely on an aging complement of processing equipment. Capital expenditures, which have decreased significantly during the past 5 years, will be only $2.5M in fiscal year 1996. Enhanced recapitalization must begin immediately to keep pace with emerging technologies and maintain a modem manufacturing capability. Recapitalization and technology upgrade needs for the Kansas City Plant have been developed but are not funded. A table describing examples of capital upgrades and replacements is attached.

Dr. WEINRICH. *INFRASTRUCTURE IMPROVEMENTS* Pantex has already submitted conservative requirements for modernizing the plant in connection with the proposed Defense Appropriations Bill funding. The following projects were selected through an extensive justification/prioritization process to insure they met the intent of the Defense Appropriations Bill and the needs of Pantex. These projects can be described as operational infrastructure improvements and categorized as follows:

• *Weapons Dismantlement* (projects support dismantlement and include such items as portable paint booth and improved training and prove-in facilities).	$8,520,000
• *Weapons Support* (directly related to weapons activities such as repair of the calibration facility and additional staging magazines).	$14,905,000
• *Safety* (improvements to the safety of the workers, public and the environment and reducing worker radiation exposure, upgrading the radiation alarm monitoring system).	$17,500,000
• *High Explosives* (projects address surplus high explosive materials generated from the dismantlement process such as the base hydrolysis process).	$1,005,000

SS&M PEIS Pursuant to the SS&M PEIS, consolidation and modernization of the assembly/disassembly activities are needed. Cost estimates are as follows:

• *Conceptual Design Reports (for projects associated with the SS&M PEIS).*	$700,000
• *Assembly/Disassembly Activities* (capital construction, transition and operating—costs would be spread over an 8-year period starting in fiscal year 1996 and ending in fiscal year 2004).	$31,285,000
• *Pit Reuse* (capital construction and process development)	$24,396,000
• *Downsizing High Explosives Operations* (capital construction, transition and operating-costs would be spread over an 8-year period) starting in fiscal year 1996 and ending in fiscal year 2004).	$12,847,000

Assumptions had a significant impact on the conclusions of the Stockpile Stewardship and Management Programmatic Environmental Impact Statement (SS&M PEIS). Presumptions that limit the future role of the production plants in stewardship activities, for example, impacted the division of roles between plants and laboratories for management compared to stewardship. Assumptions about size, character and variability of future stockpile and constancy of demand for weapons result in limited-capability facilities with fewer trained people. This planning and policy approach limits our ability to react quickly, economically and safely to changes in the demand for numbers of weapons, weapon-types and production of new weapon types. Even the DOE concedes that consolidating high explosives operations at the laboratories results in greater technical risks. (Page 19 of the Preferred Alternatives Report)

The assumptions that DOE used in the SS&M PEIS were intended to provide a common basis for by site comparison; however, the assumptions only bound a portion of activities that would be performed by the chosen site. The full range of work needed to accomplish stockpile stewardship and management goes far beyond the limits of activities used for site comparison. Some of the work requirements not considered in that PEIS include:

- Impact of converting DOE orders to Federal regulations (This will greatly increase the workload)
- Modernizing facilities
- Upgrading plant infrastructure
- Accomplishing formalized operational practices such as "Conduct of Operations"

Therefore, the financial conclusions reached in the SS&M PEIS are not based on a complete operational picture. We are concerned that if these PEIS figures are used for budgetary purposes, sufficient resources will *not* be provided for actual stockpile management operations.

Ms. CLEGG. The original assumptions of the SSNTEIS were based on a START II level stockpile. As a part of the study, the DOE asked each site to assess a "high case", which equated to a START I level stockpile. The study did not include a rapid reconstitution option that would support the inactive stockpile. Our proposal to downsize the Kansas City Plant was based on START I levels of production using single-shift operation; staffing was at the START II level. We believe that the capability and capacity to support short surges in production will exist with the proposal that we have provided to the DOE. There is risk, however, that a common mode failure in the stockpile could overwhelm the downsized complex. Further, staffing should not be reduced to the START II level if a START I stockpile remains a viable possibility. We believe that we can manage staffing requirements adequately if we have time to react to potential changes in the level of production, but continued management and oversight attention to production capacity sizing should be emphasized.

STOCKPILE STEWARDSHIP AND MANAGEMENT PEIS

Senator KEMPTHORNE. Would each of the production plant directors tell the subcommittee whether the assumptions underlying the Stockpile Stewardship and Management PEIS greatly impacted the conclusions of that study? For example, did a "rosy scenario" about the world situation imply no need for a robust reconstitution or a "surge" capability which would have required continued dependence on the production sites?

Mr. GUSTAVSON. The underlying assumptions in the SSM–PEIS did not greatly impact the selection of the preferred alternatives for production operations. The baseline capability as well as the surge capability were defined up front. They are not, in my opinion, considered "robust" or aggressive. Much emphasis (and funding) was focused on the science-based stockpile stewardship. The underlying assumption of 3 years to bring on capability left in "cold standby" is an essential issue. Remanufacturing of proven weapon designs at some nominal level is a logical approach for assuring core competency of the production plants and continued weapon systems reliability based on previous underground test results.

One questionable assumption in the PEIS is the necessity for the design labs to maintain a robust capability in surveillance and production process technologies both of which duplicate production plant competencies. This assumption is based on the rationale that (1) stockpile levels may get even smaller than START II levels, (2) that dedicated production facilities would no longer be justified at these smaller levels, and (3) that this investment would help to minimize the risk of moving the production to the labs. The flaw in this logic is that the cost evaluation used to select the preferred alternative was based on the minimum production needed to maintain a production capability. Therefore, the smallest production case possible has already been evaluated and the production sites were the least costly.

FISCAL YEAR 1996 BUDGET INCREASE

Senator KEMPTHORNE. Dr. Reis, the Senate Armed Services Committee took the lead last year in the effort to increase funds for the stockpile management program. Can you tell us how this increase in funds is being used? Also, did the concerns of this committee and the Congress have any impact on the recently released draft programmatic EIS?

Dr. REIS. This funding was allocated in the following manner:

ALLOCATION OF $106 MILLION

[In millions of dollars]

Site/Activity	Enhanced Surveillance	PEIS CDRs	Tritium	Workload	Infrastructure/Total
Kansas City	$3.7	$1.1		$23.2	$28.0
Savannah River	1.0		$20.1		$21.1
Y-12 Plant	3.5	1.5		30.0	$35.0
Pantex Plant	3.3	0.7		13.0	$17.0
Idaho National/Engr Lab			2.9		$2.9
Pacific NW Lab			2.0		$2.0
Total	$11.5	$3.3	$25.0	$66.2	$106.0

In developing the Draft Programmatic Environmental Impact Statement (PEIS) for Stockpile Stewardship and Management, the DOE evaluated concerns and considered all inputs received prior to its publication. As you are aware, the preferred alternatives included in the Draft PEIS maintains all current production facilities, but at a more cost effective and efficient capacity. The PEIS was released on February 28, 1996 with a comment period from March 8, 1996, to May 7, 1996.

WEAPONS REMANUFACTURE

Senator KEMPTHORNE. Secretary Curtis, in his prepared statement Dr. Smith states: "Today, we do not have the capability to manufacture replacements for the nuclear weapons that comprise our existing stockpile." Assuming the need for destructive tests to assess a weapons reliability, does this concern you?

Mr. CURTIS. Support of the nuclear weapons stockpile is the Department's highest priority, and we are concerned whenever we cannot meet all potential manufacturing requirements. However, in general, only one nuclear weapon of each type in the active stockpile is destroyed through testing each year as part of the Department's Stockpile Surveillance Program. In the past, sufficient replacement weapons were manufactured for those expected to be lost in assessing reliability over the expected life of the weapon. As the age of weapons in the stockpile has increased and the number of original replacements available decreased, weapons removed from the reduced active stockpile have been retained in the inactive stockpile to serve as additional replacement weapons. The Department is also working to remedy the situation where certain replacements cannot now be manufactured, most notably pit fabrication and enriched uranium operations. The Department is confident that its current schedule of replacement capabilities will meet the needs of stock pile including, the destructive testing of weapons to assess their reliability.

TRITIUM REQUIREMENTS

Senator KEMPTHORNE. Secretary Reis, if Russia fails to ratify Start II, can the accelerator technology meet our nation's tritium requirements? Dr. Smith, would you also comment on this question? Also, what is the estimated energy cost of accelerator production of tritium for a START I force structure?

Dr. REIS. If Russia fails to ratify START II, the maximum production capacity of a single accelerator can meet START I requirements, including the 5 year reserve.

An accelerator making enough tritium to support a START I stockpile would use approximately 350–450 MWe of power annually, at an estimated cost of between $50–$125 million.

Senator KEMPTHORNE. Are there manufacturing capabilities/capacities at the sites, such as the one in Kansas City, that could be applied to other manufacturing requirements for either the Department of Energy or the Department of Defense?

Mr. GUSTAVSON. The Department of Energy (DOE) production plants possess many special and unique manufacturing capabilities that are of tremendous value to other organizations within the DOE, other Federal agencies, and the private sector. The expertise of the people, coupled with the equipment and facilities established over the past 50 years, covers a broad range of advanced engineering, applied development, manufacturing, and testing technologies. The production plants have proven especially valuable in the transformation of laboratory theory into world-class production practices. In addition to Kansas City, DOE has production plants in Oak Ridge, TN (Y–12 Plant), Amarillo, TX (Pantex Plant), and Aiken, SC (Savannah River Plant).

These skills and capabilities can be, and in some cases are, maintained by managing and performing both classified and unclassified projects in a manner that is responsive to the technical, programmatic, and business needs of other Federal agencies and the private sector. Application of the DOE manufacturing capabilities to the needs of other Federal agencies typically is demonstrated through the manufacture of complex prototypes, on-demand/emergency manufacturing, and development of the supporting production methods. These methods may then be transferred to either the private sector or military production facilities for routine production.

Several statutes and regulations serve to overly restrict the effective use of the DOE manufacturing capabilities in support of other programs. Among these are:

- 48 CFR, Section 235.017–1 enables DOD sponsored Federally Funded Research and Development Centers (FFRDCS) to respond to competitive Federal solicitations, whereas the DOE funded laboratories and production plants are restricted by the definition of their mission in the Atomic Energy Act of 1954 (42 U.S.C. 201 11 et al.) and are not permitted to respond.
- The Levin Amendment to the Economy Act serves to limit the use of other agency resources, even when in the best interest of the Government.
- 31 U.S.C. 1535 prevents obligations for work by other agencies from crossing fiscal year boundaries, resulting in unnecessary additional agreements and delays.
- Current regulations (e.g., 10 U.S.C. 2373 and 41 U.S.C. 253(b)(1)) fail to exploit the potential of the DOE facilities in performing precompetitive research and development activities for other Federal agencies.
- 31 U.S.C. 9701 and the resulting flowdown through departmental financial policies results in the Department Added Factor being applied broadly to work for other Federal agencies.

The manufacturing technology in the nuclear weapons complex is truly world class, and our workers are exceptional. In my opinion, Congress should consider actions to ensure that this technology and expertise is retained in a cost-effective manner. One way to do this is to continue to encourage Work for Others programs at the production sites.

Dr. WEINRICH. Yes, Pantex has manufacturing capability that could be considered core capability for U.S. national security. Examples of core capabilities with benefits for DOD, DOE and other national security users include design and production of specialized tooling, machines and fixtures with inherent safety interlocks for assembling and disassembling high hazard devices; facilities for synthesizing and manufacturing specialty explosive components; nondestructive and non-intrusive examination and assessment of conventional, non-conventional, nuclear, and specialty weapon systems and components; and manufacture and assembly of specialty devices incorporating explosives, special nuclear materials, and other high-hazard components. At a specialized level of facility and human resource capability, Pantex expertise such as blast containment, process control, electronic device fabrication, safety system design, is applicable to many DOE and DOD needs.

It should also be noted that Pantex is already using Plant resources in supporting projects for other organizations. For example, advanced high explosives such as HNS and TATB are manufactured for DOD and commercial needs. Advanced analytical surface analysis equipment is used to support DOD Office of Veterans Affairs Research on breast cancer. Advanced analytical capability at the Plant is used to predict stockpile life expectancy to establish programs to replace components before they fail.

The Plant has also developed core competency in security systems designs, material accountability and physical security operations.

COST OF LAB

Senator KEMPTHORNE. Ms. Rohlfing, can you describe the cost of the lab to lab relationships under your program? Also, what, if any, procedures are in place to insure U.S. funds do not support Russian nuclear weapons, activities?

Ms. ROHLFING. The Department of Energy's nuclear materials protection, control and accounting (MPC&A) Program includes complementary government-to-government and lab-to-lab arrangements, and is intended to strengthen nuclear material protection, control and accountability at the facility and national levels. The program seeks to rapidly improve MPC&A for materials that are directly usable in nuclear weapons (including plutonium and highly-enriched uranium) through technical collaboration with facilities and government managers in Russia and the Newly Independent States (NIS); through regulatory development activities, such as licensing and inspection program development; and through implementation of modern safeguard technologies at Russian and NIS facilities. Funding for the MPC&A program for fiscal year 1996 is at the level of $85 million. This funding supports ongoing nuclear material security improvements at 35 different locations in Russia and the NIS, which involves about 75 percent of the locations where such material is believed to be stored. The MPC&A program includes a system of assurances for facility improvements implemented through projects undertaken within the program. This system and its attendant procedures and reporting is designed to provide assurance that the material, equipment, and services provided under the program are being used for their intended purpose.

The New Independent States Industrial Program (NIS–IPP) has in place or completed over 200 lab-to-lab agreements (about 85 percent with Russian weapons of mass destruction institutes) with 77 former weapons of mass on institutes of the four nuclear successor states of the former Soviet Union (Russia, Ukraine, Belarus, Kazakhstan). These have been funded as subcontracts from the ten DOE multiprogram labs who are involved in IPP. Total funding allocated for these subcontracts so far is $12 million, although not all of this has been costed; fumds are paid out to the institutes only as contractual deliverables are rereived by the DOE laboratories issuing the subcontracts.

IPP has numerous safeguards built in to ensure that the funds are used for nonmilitary applications and that no funds are diverted for military use. For example, funds are released only on receipt of deliverables; all projects are cooperative efforts involving direct interaction between U.S. and NIS participants; funding levels are low and are used to "seed" larger commercial ventures supported by the private sector, and the flow of technology is predominately from the NIS to the U.S. These factors, plus adherence to detailed procedures and established policy oversight, ensure that the IPP funds are appropriately expended to benefit our nonproliferation objectives.

QUESTIONS SUBMITTED BY SENATOR JOHN ASHCROFT

RELATIONS BETWEEN THE PRODUCTION SITES AND THE NATIONAL LABORATORIES

Senator ASHCROFT. What can be done to improve the relationship between the production sites and the national laboratories to ensure that both of these critical parts of the weapons industrial complex are maintained for the future?

Dr. SMITH. Given their declining budgets and staffing levels,the production facilities and laboratories will have to work in ever closer coordination in the future. I believe that a solid foundation of cooperation already exists and the directors and managers of these faciltiies are working together to see that this trend continues.

Mr. CURTIS, Ms. ROHLFING, and Dr. REIS. The Department is using several initiatives to enhance the relationship between production sites and the national laboratories. The Process Capability Assurance Program (PCAP) and Process Development Surveillance Implementation Plan (PDSIP) exist to exercise the laboratory/plant relationship, promoting teaming and concurrent engineering, while meeting current and future requirements. The Enhanced Surveillance Program includes activities requiring the interaction of staff from the laboratories and plants to address issues associated with aging and manufacturing. Finally, the Advanced Design and Production Technologies (ADAPT) program seeks to foster rapid product realization with advanced manufacturing technologies, simultaneously sponsoring the integration of laboratory and plant computer network connectivity. Each of these initiatives strengthens the weapons industrial complex, supporting present and future requirements.

Dr. WEINRICH. Eliminating competition for future missions and mission work would improve the relationship between the production plants and the laboratories. As long as each sees the other as competitor for the same future work, antagonisms will continue. This contention results, in part, from assumptions about preserving facility and human resource capability at the laboratories by transferring shrinking production functions from the plants to the laboratories instead of substituting work appropriate for the laboratory function. Joint and mutual goals with respect to stockpile management and stewardship could eliminate an anticipated tendency to create problems and problem ownership simply to generate work activity and funding. Stability in role definitions and functional expectations would reduce the predatory view each kind of facility has of the other during these times of adjustment to change.

Ms. CLEGG. The DOE and Congress must provide stability for the nuclear weapons complex. A future must be defined for both the laboratories and the plants which creates an environment of cooperation and integration of responsibilities rather than an environment of competition for survival. Funding to modernize and recapitalize the plants will help us to keep pace and be better partners with the laboratories. With stability of mission. and budgets, relationships among the laboratories and the plants will flourish.

Mr. GUSTAVSON. The lines of communication are being strengthened to ensure that all parties who contribute to our nuclear defense are actively involved in planning as well as execution. This effort needs to continue. Information and strategies should be shared openly from the Department and Laboratories with the production sites. The inclusion of a single rotating member representing the three production sites on the DOE Defense Programs Science Council is a proactive step in ensuring involvement of all parties. Although decision making ultimately rests with the Department, planning without input from the production sites can lead to conflict and misunderstanding of roles and responsibilities.

There will continue to be a strong need and reliance on the production sites within the complex. The competition of the laboratories against the plants for work assignments that are clearly manufacturing-related has been a major divider and should be discouraged within the Department. Each provides a unique and necessary piece of our national nuclear weapons complex, and both maintain competencies essential to the credibility of our national posture.

Dr. ROBINSON. Several mechanisms for increasing plant and laboratory cooperation have been established in lieu of the traditional full-scale weapons production activities. DOE's Process Development and Surveillance Implementation Plan (PDSIP) effort, joint information management activities (DPNET), and future plans for Advanced Design and Production Technologies (ADaPT) will all contribute to restoring the ties between the plants and the labs following the hiatus in weapon builds. Sandia has established a management council with Allied Signal, Kansas City Division, to facilitate a continuous dialog on matters of importance to the two sites.

MANUFACTURING CAPABILITIES/CAPACITIES

Senator ASHCROFT. Are there manufacturing capabilities/capacities at the sites, such as the one at Kansas City, that could be applied to other manufacturing requirements for either the Department of Energy or the Department of Defense?

Dr. SMITH. The production sites have traditionally supported the fabrication of parts for the nuclear weapons stockpile. Their respective capabilities and capacities certainly could be used to manufacture items within their manufacturing base other than nuclear weapon components or associated hardware.

Mr. CURTIS, Ms. ROHLFING, and Dr. REIS. The nuclear weapons complex currently uses capabilities/capacities at facilities to manufacture products for the DOD on a reimbursable basis, while supporting nuclear weapon production requirements. Through industrial competitiveness initiatives and Work For Others, the Department applies weapons complex assets to the manufacture of non-DOE products. This work is conducted in accordance with statutory limitations regarding non-competition with the private sector. The Department has continued interest in production activities demonstrating synergy with core missions.

Ms. CLEGG. The Kansas City Plant has the capability and technical expertise to support a wide variety of missions for other DOE and DOD applications. High precision mechanical, electromechanical, electrical, electronic, and plastic products are developed and produced at the plant. Support of accelerator technology, safe secure transport, special containers, and variety of logistical support missions are currently supported by the Kansas City Plant and can be expanded to support new DOD customers (e.g., base closing logistics) and new DOE customers (e.g., containers and detectors). Such work helps to reduce overhead at our plant and provides a more cost effective nuclear weapons complex.

KCP RECAPITALIZATION PLAN

[In thousands of dollars]

	FY97	FY98	FY99	FY00	FY01	FY02	FY03
Electrical and electronic products:							
CAE upgrade	....	1,500	....	....	1,500	....	250
Laser trim system	300	....	....	....	....	....	....
Pick and place machine	....	500	....	....	....	500	....
Belt and reflow machine	....	500	....	....	....	500	....
Automated assembly equipment	....	1,100	....	....	1,500	....	....
Dehumidification equipment	....	....	1,000	....	....	....	....
Flip chip and gold bonders	....	....	625	....	....	....	....
Soldering equipment	....	....	....	200	....	....	....

KCP RECAPITALIZATION PLAN—Continued

[In thousands of dollars]

	FY97	FY98	FY99	FY00	FY01	FY02	FY03
High speed digital test system	....	1,900	....	500	....	....	....
Optical processing test system	....	....	....	1,000	....	2,000	....
Advanced microelectronic interconnect equipment	....	....	....	....	....	....	1,500
Mechanical Products:							
EB welder replacement	1,100	1,100	1,100	1,100	....	600	....
Resistance welder replacement	1,200	....	....	....	....	....	....
Air heat treat furnaces	....	....	....	800	....	....	....
Pit heat treat furnace	....	....	....	....	400	....	....
Vacuum furnace	....	....	....	....	....	300	....
Machine tool upgrade	750	750	750	1,500	1,500	....	....
FMS upgrade	....	....	....	500	500	500	....
Hydroform rebuild	....	....	....	....	....	....	2,000
Crush grinder	....	....	....	....	....	450	....
Laser welder	....	....	....	....	275	....	....
Instron testers	....	....	....	220	....	....	....
Backfill stations	....	....	....	....	....	....	380
Rubber and Plastic Products:							
Molding equipment upgrades	500	500	1,500	500	500	500	....
Autoclave	....	....	100	....	....	....	....
Foam mixers/dispensers	100	100	....	....	....	....	....
Laboratory support:							
Accelerated aging equipment, gas chromatography	1,850	....	....	....	....	....	....
Image analysis equipment and mass spectrometer	....	1,500	....	....	....	....	....
Metallurgical analysis equipment and AUGER spectrometer	....	....	1,200	....	....	....	....
Electron microprobe	....	....	....	....	900	....	....
Vibration and shock testers	....	1,100	....	350	400	....	....
Ion implanter and mill	800	....	....	....	....	....	....
Sputtering system	....	....	700	....	....	....	....
XPS analysis system	....	....	....	....	....	....	1,700
Microfocus X-ray system	....	....	....	....	....	....	650
Calibration and standards replacement	....	....	....	750	750	750	750
Information Processing and Telecommunications:							
Shop floor system	1,100	....	....	....	....	....	1,200
Mechanical CAE upgrade	1,500	....	....	....	....	1,000	....
Quality data acquisition system	....	....	1,000	....	....	....	1,000
Telecommunications improvements	....	1,000	1,000	1,000	1,000	....	....
Data storage/archival	2,000	....	....	1,000	....	1,000	....
Total	11,450	11,550	8,975	9,420	9,225	8,100	9,430

Dr. ROBINSON. Undeniably yes. Keeping in mind that our production sites should not compete with the private sector, there are many contributions that they can make supplying a manufacturing capability for DOD and DOE where a controlled (classified) environment is required. These would include, but not be limited to, providing electronics and electromechanical devices for black programs and command and control activities.

[Whereupon, at 1:05 p.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1997 AND THE FUTURE YEARS DEFENSE PROGRAM

WEDNESDAY, MARCH 20, 1996

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

SPACE PROGRAMS AND ISSUES

The subcommittee met, pursuant to notice, at 9:37 a.m. in room SD–562, Dirksen Senate Office Building, Senator Trent Lott (chairman of the subcommittee) presiding.

Committee members present: Senators Lott, Exon, and Bryan.

Professional staff members present: Eric H. Thoemmes.

Minority staff members present: William E. Hoehn, Jr.

Staff assistants present: Franklin H. Turner and Jennifer L. Wallace.

Committee members' assistants present: Judith A. Ansley, assistant to Senator Warner; Samuel D. Adcock, assistant to Senator Lott; Glen E. Tait, assistant to Senator Kempthorne; and Andrew W. Johnson, assistant to Senator Exon.

Committee members' fellows present: Thurston E. Womble, fellow to Senator Lott; Maj. Marc T. Thomas, fellow to Senator Kempthorne; and Linda Taylor, fellow to Senator Bingaman.

OPENING STATEMENT OF SENATOR TRENT LOTT, CHAIRMAN

Senator LOTT. Welcome, gentlemen. It is a pleasure to have you here. The Strategic Forces Subcommittee meets today to receive testimony on the DOD space management programs and associated issues. To my knowledge, this is the first congressional hearing on this subject since DOD's new space management structure was introduced last year.

We are very pleased to welcome Mr. Robert V. Davis, the Deputy Under Secretary of Defense for Space. I understand your office, Mr. Davis, recently celebrated its first birthday, so it has been in existence one year. Congratulations, and I am curious to see what kind of grades you give yourselves with that first year in that position.

Joining Mr. Davis is General Joseph W. Ashy, Commander in Chief of the U.S. Space Command; Maj. Gen. Robert Dickman, the DOD Space Architect, and Keith Hall, the Acting Director of the

National Reconnaissance Office. Gentlemen, we are glad to have you here.

I do have a few brief remarks, and then I would like to call on the distinguished ranking member, Senator Exon, for his comment.

I understand that you will all make brief opening statements, and that, General Ashy, you will present a demonstration of the theater support operations cell, which Space Command uses to help the war-fighting commanders and others to better understand space systems and their capabilities. Before we proceed with your opening statements, though, I would like to just make a couple of comments and leave a couple of thoughts with you to take away from today's hearing.

Last May the Strategic Subcommittee conducted a hearing on DOD's space programs and management. At that time the new space organization was just being set up. Mr. Davis had not yet been appointed, nor had the Architect's Office or the Joint Space Management Board been established. Today, these organizations are in full swing, I am pleased to see, and from what I have been able to determine these are having a good effect and taking some positive steps.

At last year's hearing I expressed a number of concerns. Particularly, I worried that the Space Architect would become essentially an Air Force organization rather than a truly joint outfit. I also questioned the long-term wisdom of setting up a DOD space architect rather than going directly to a National Security Space Architect to more fully integrate DOD and intelligence space programs. So I look forward to hearing your comments on these matters after a year's worth of experience.

The space initiatives currently under way in the Department will significantly shape American space power over the next several decades. If we do not provide lower cost and more flexible access to space, then we will miss numerous opportunities to leverage developments in other areas. Substantial improvements can and must be made to military satellite communication systems, perhaps by placing significantly more emphasis on commercial systems and technologies. Our success in improving the cost and operational effectiveness of intelligence, surveillance, and reconnaissance systems will significantly impact our global presence and power. I believe we should be aggressively pursuing the development of small satellites for a range of missions.

I am pleased that the Department has adopted an architecture approach to space systems and supporting infrastructure. This approach offers the promise of significantly leveraging space resources, and hopefully freeing up funds to continue pushing the technological cutting edge.

In general, there is strong support, I believe, on the subcommittee, and I believe in Congress overall, for the Department's space program. Although there are differences on certain details, obviously, there is a great deal of consensus, I believe, between Congress and the Department on most of these space programs.

I must say, however, that we have not received what I regard as a commensurate degree of cooperation and support from the Department on a number of programs and initiatives of importance to the members of this subcommittee. Time and time again I have been frustrated to learn that funding for critical programs of interest to the subcommittee has been withheld or placed on a recision list. The space and missile tracking system, the microsatellite technology program, and the Army's kinetic energy antisatellite program, are among the key programs whose funding is being partly or entirely withheld. These are not pork programs, they are merit-based initiatives that deserve, I believe, attention and adequate funding.

I can understand why, in the first place, the Department did not request the amount of funding that I believe is necessary for these programs. All the services, frankly, are woefully under funded, and certainly would like to have more funds. Also DOD's recent budget requests have been obviously below what we had hoped for. But I do not understand the Department's failure to use funds appropriated for such important defense programs, especially since these funds were not taken from other DOD priorities, and the alternative is essentially to waste them. It will be extraordinarily difficult for this Senator and I think some others to continue supporting DOD with its new and ongoing space initiatives if the degree of cooperation received does not improve along the way. I am hopeful that it will. I believe that it can, and we should work toward that goal.

Let me say in closing that I very much want to support the Department's space initiatives. I believe that our investments in space capabilities have the potential to dramatically magnify and diversify our war-fighting capabilities across the board. As we have experienced repeatedly in recent years, space is a force multiplier, especially in an environment where the United States will have less force structure than in the past. We must find ways to fight smarter. The effective use of space, I believe, is the key to achieving that goal, and therefore I appreciate your being here, your testimony, and I would like to yield now to our ranking member, Senator Exon of Nebraska.

STATEMENT OF SENATOR J. JAMES EXON

Senator EXON. Mr. Chairman, thank you very much, and I appreciate your courtesy. I apologize to you and the witnesses this morning. Since I do not arrange the schedule here anymore, I have a meeting at 10:00 at the Budget Committee where I have my responsibilities with Alice Rivlin, the Director of Office of Management and Budget on the present budget that I must excuse myself to in just a few moments, but I will be looking at the testimony on these programs.

If I might, Mr. Chairman, after my 2 or 3 minute remarks, if I could interrupt the program, I would very much like to have the opportunity to see the 5-minute presentation, I believe, that General Ashy is going to make, that I think perhaps will answer an awful lot of my questions that we started with a whole series of questions last year.

I congratulate each and every one of you. Mr. Chairman, this is an extremely timely meeting, and despite the fact that it is in with two or three that I think both of us feel we have responsibilities to be, but we cannot be everyplace at the same time. I simply want to reiterate the chairman's remarks. I do not believe there is any program that has a higher priority for this Senator than what you people are about, both representing the administration and the military. I would simply say that I would certainly agree with the basic thrust of the chairman's statement. War-fighting is what this is all about.

Space, space technology and space management and its structure that you are responsible for is one of the most essential programs that I have ever been involved in in my years here in the Senate. So I would simply say that we gave you several challenges last year. I wish that I could be here to hear the answer to those questions, but from information that I have had with meetings with General Ashy and others, I congratulate all of you for doing what I think is an exceptionally fine job, because I really believe that our space initiatives, our space intelligence systems, are an absolute essential key, more-so than they have ever been in the past, as we continue to face a very dangerous world. Congratulations for the job that we are doing.

Senator EXON. If I might, would it be appropriate, Mr. Chairman, if we could see that 5-minute film before I must leave?

Senator LOTT. Senator Bryan, would you mind if we go ahead and see a brief film that they have before you make your opening statement?

Senator BRYAN. I would not. In fact, I will go further, Mr. Chairman. I will waive an opening statement to allow this to proceed.

Senator LOTT. All right.

Senator EXON. Mr. Chairman, I will have some questions for the record that I will submit, and I appreciate your responding in a timely fashion.

Senator LOTT. You were going to go last, General, but if you will go first, at least as far as this demonstration, we would appreciate that, so that all of the Senators will have a chance to see it.

STATEMENT OF GEN. JOSEPH W. ASHY, USAF, COMMANDER IN CHIEF, U.S. SPACE COMMAND

General ASHY. Sir, if I could just introduce it on the microphone first, before I walk up there, it is great to have the opportunity to come before you and the committee to give you a progress report. As you all have stated, in the modern day battlespace, the use of space-based assets is absolutely key to winning. Also having been on the other end of this in theater combat operations as the air commander, it influenced us to try to come back in this past year since we met last time with members of this team, which I am proud to be sitting with. This is a powerful message that you all gave us, we received, and report to you all on how we are trying to make this accessible and understandable and usable to the war-fighter.

So with that, that is the objective, and this is a tool that we have put in place.

Senator LOTT. Could I ask your staff to come and move this a little bit to where Senator Bryan can see it?

General ASHY. What we tried to do, sir, is make this understandable, and therefore more accessible to the war-fighter. Before I tell you a little bit about what you are about to see, I have four missions given to me in the Unified Command Plan by the President, Dr. Perry, and General Shalikashvili. The first one is placing things in space and operating them. The second one is space force enhancement, which is these five services, and I will come back to that in a moment. The other one is space control, that is protection and denial, and then space force application.

This morning I would like to show you a quick little demonstration on enhancement, which is the service that we provide to the war-fighter. This is precision navigation through the GPS system. This is communications, intelligence, weather support, and ballistic missile warning to the theaters of operation. I have seen NORAD do that in a strategic sense, but as you gentlemen know, we do this for our theaters, and we have improved this since Desert Storm. So that is what I am talking about here.

Also, I am going to show you this because it is declassified, but it is an example of what we take to the theaters through what we call theater support teams that we have organized, to the various theaters. They organize, they train with the theaters, they exercise with the theaters, and they operate with the theaters.

The first one is an animation of our global positioning system. This is the navigation surface. So what I am trying to show you here is that a war-fighter can take this thing now and use it, and I have done this for Admiral Smith and General Ryan as war-fighters, just so you all can see this. We can do this for any theater, but the example here is Bosnia. So you can actually see what satellites are there, and then you can see what is over Sarajevo, and this is really important.

Lieutenant, if you will stop it here just a minute, the number of satellites that look at a place while you are receiving it is important, because that affects in a positive way the accuracy, so a war-fighter can have this in any command post and show that if you are going to attack something with precision you have the adequate number of GPS receivers looking at it. So this is very understandable.

I can tell you that I did not have this accessible to me, and I wish I had, and that is what influenced us to do this. It is just an example of how we support the war-fighter.

I am going to show you the same format for all the constellations so you can get an idea. This is weather, as you will see when she starts the motion here. You will be able to see the three satellites which are the Defense Meteorological Support Program satellites. This is NOAA satellites, but you can see it is very understandable, because you can see the footprint of what is being sensed by the satellite.

If General Ryan needs to know what the weather is, the satellite comes over, and you can see that little yellow line there is when he gets the down-link. Most importantly, he has a schedule now to show exactly when it is going to be overhead and when this is accessible. Also, if you want to attack someone in today's world with an infrared sensor, you have got to really know what the moisture content is in the atmosphere.

Okay, the next one is missile warning. Again, this is just an example. As you all know, these are the big infrared sensors we have in geosynchronous orbit that see heat sources coming off of the globe to give us initial warning. I perform this mission as

CINCNORAD to give attack warning and assessment to the Prime Minister and the President. If we come under attack, we also use this system for theater warning, and we have improved this through a system that is a digital system to provide near real time information to the theater commanders.

Again, you can see the satellite footprints that see a particular area, in this case General Joulwan and Admiral Smith. The same would be true for General Peay, and certainly Admiral Prier and General Luck, and you can see on this chart here that we have X number of satellite footprints looking at an area. I would just add to the committee, sir, that the more satellites you have looking, it is like stereophonically, you have better accuracy.

The next one is just a communications example. This happens to be the system that our Army component operates called the Defense Satellite Communications System Constellation, and it is the same format. You can see that we have animated it such that in a specific theater you can see the footprints of the satellites. We are going to talk, I think, a little bit more about this later, because we have really made some good improvements, Senator Lott, with regard to your words about the need to leverage the commercial capabilities to do this better.

This is an imaging satellite that happens to provide multispectral imagery, where we can take a photo and use it. These happen to be two French satellites whose products we can purchase, and this one is an American satellite, but again, you can see the footprint and the schedule. I have used this as just an example because there are many other systems that we have to do these missions. Of course, the schedule is really important in operations when you want to do pre and post-strike assessments. Then in summary, sir, there is a schedule summary here that any warrior can use in their command and control.

So that is very brief, sir, and I hope it gives the committee just an idea of what we are trying to do to make this understandable and accessible.

Senator EXON. General, thank you very, very much. I appreciate your interrupting the schedule.

I appreciate your courtesy, Mr. Chairman.

Senator LOTT. Do you have any questions?

Senator EXON. I do not have any basic questions. I will ask questions for the record, simply to say it seems to me that my assumption that we had made significant if not magnificent strides in the last year are borne out here, and I will be reviewing the testimony to try to keep abreast of this as much as I possibly can.

Thank you, Mr. Chairman, and I appreciate the witnesses delaying the schedule to accommodate me.

Senator LOTT. Thank you very much, Mr. Davis, for allowing that little change in the schedule, but I know that Senator Exon wanted to see that, and we are delighted to have you here, and will be glad to hear your testimony.

STATEMENT OF ROBERT DAVIS, DEPUTY UNDER SECRETARY FOR SPACE, DEPARTMENT OF DEFENSE

Mr. DAVIS. Thank you, Mr. Chairman. You started with the dessert, your reward for listening to the rest of us.

Senator LOTT. Well, you whetted our appetite significantly.

Mr. DAVIS. I am pleased to be here today, together with General Ashy, Mr. Hall, and Major General Dickman, to discuss Department of Defense space activities. I would also like to take the opportunity to thank this committee in particular for its leadership and urging and, when necessary, directing the Department of Defense to improve its management of space programs and to enhance our space capabilities and their responsiveness to the war-fighters.

Since my entire statement will be available in the record, I will summarize a few of its important points, and I will have a few slides in a minute, but the slides of my opening statement will stand alone.

Having been in my current position for approximately 7 months, I have had the opportunity to view the current state of space activities within the Department of Defense from a fresh perspective. One way of characterizing these activities is to find the answers to several compelling questions.

CHART 1.—PROBLEMS

- Are DOD space programs adequately supporting the warfighter?
- How should DOD be reorganized to ensure a cohesive and consolidated management of space activities?
- How is DOD improving the space planning and acquisition process?
- Does DOD have a vision for the future for the exploitation and utilization of space?

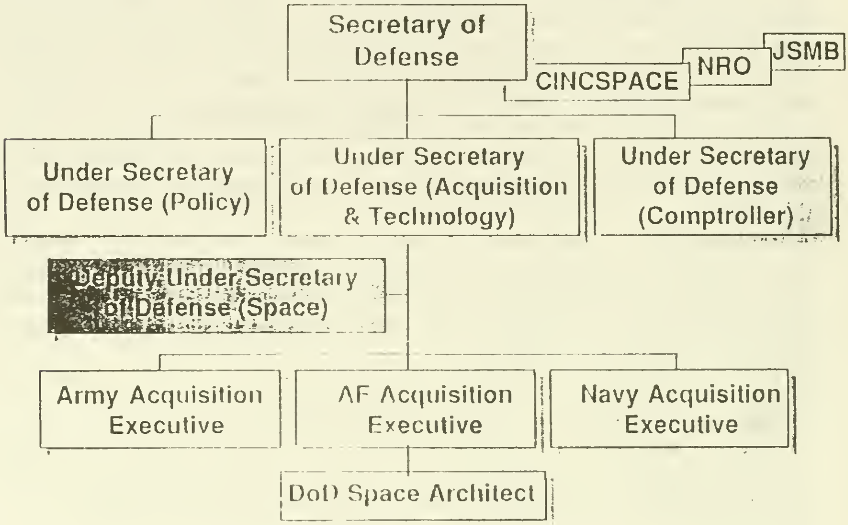
Mr. DAVIS. These questions are: Do DOD space activities provide adequate support to the war-fighters, are we properly organized, is there unwarranted duplication, and where should we be going in the future? To address these questions the Department has made a number of changes. Some of these steps have been completed, some are in progress, and others are in planning. The bottom line is that the Department's space activities are being addressed in a totally different manner than you heard last year, and you referred to that already.

CHART 2.—SOLUTIONS

- Create viable, interoperable architectures supporting the warfighter.
- Integrate warfighter requirements directly into the planning and acquisition process.
- Create an organization within DOD to centralize the management and oversight of DOD space programs.
- Establish long-term goals and develop a strategic master plan for space.

Mr. DAVIS. Mr. Chairman, this slide summarizes our focus in implementing improved management and operations of space activities: First, think in terms of overall architectures, and you touched on that in your opening statement. That is critically important, get the war-fighter in the process early and continuously. If necessary, but only if necessary, restructure organizations; and finally, define our goals and focus our resources to reach them.

DoD Organization



Secretary of Defense

CINCSPACE

NRO

JSMB

Under Secretary of Defense (Policy)

Under Secretary of Defense (Acquisition & Technology)

Under Secretary of Defense (Comptroller)

Deputy Under Secretary of Defense (Space)

Army Acquisition Executive

AF Acquisition Executive

Navy Acquisition Executive

DoD Space Architect

Mr. DAVIS. I know organizational charts are boring, but this one is important because I think it captures a lot of what we have been doing and a lot of what your questions will be about. An important change is consolidation of all space responsibilities and functions within the Office of the Secretary of Defense under the Deputy Under Secretary of Defense for Space. You see that block in red on the chart, since that is my office I took the prerogative of putting it in red and highlighting it, sir. Serving in that capacity, I report directly to the Under Secretary of Defense, Dr. Paul Kaminski.

A second change is creation of the DOD Space Architect, that is blocked in the lower center of the chart. You can see the relationship between the DOD space architect and other organizations. For administrative purposes the architect reports to Under Secretary Kaminski through the Air Force acquisition executive. I think General Dickman may touch on that later, but I want to emphasize the point that this is for administrative purposes only.

One of the questions that keeps coming up, and you alluded to it in your opening statement, to what extent will the Air Force capture the Space Architect? He has not been captured and will not be captured, and even though you see the line through the Air Force acquisition executive there, that is administrative purposes only. I can assure you of that. My office provides the overall guidance and priorities to the Space Architect. At this time, under my oversight responsibility, General Dickman has initiated architecture efforts in two areas, advanced military satellite communications, space control, and will soon start a third dealing with telemetry tracking and commanding.

What about the war-fighter? We are committed to improving space support for military forces world wide. General Ashy is critical to ensuring that the war-fighter's perspective is represented. The direct participation and coordination between USCINCSPACE, my office, the Space Architect, and the NRO, allows General Ashy to influence and contribute to the decision making process.

On the chart you will also notice in the upper right corner a small but important block labeled JSMB, short for Joint Space Management Board. It was created last December by the Secretary of Defense and the Director of Central Intelligence as a mechanism to ensure that space activities are affordable and responsive to user requirements, to improve management and prevent duplication, and ensure that all space stakeholders have a voice in the process. It is cochaired by the Under Secretary of Defense for Acquisition and Technology and the Deputy Director of Central Intelligence.

In addition to several other key partners, everyone sitting at this table today is a member of the JSMB. To reflect the improved coordination between DOD and the NRO, I and the Director of the NRO serve as the co-Executive Secretaries of the JSMB.

CHART 4.—DUSD (SPACE) RESPONSIBILITY

- Space Policy
- Space Systems and Architectures
- Space Systems Acquisition

Mr. DAVIS. This one is a quick summary of the responsibilities of my office. Other than just let you glance at it, I will not say anything more.

CHART 5.—JOINT SPACE MANAGEMENT BOARD

- Purpose
- Composition and Organization
- Actions to date
  - IPT being formed to review NRO programs and activities
  - GBS acquisition management approach

Mr. DAVIS. I have already spoken about the purpose and composition of the JSMB. However, if you would look at the third bullet, entitled "Actions to date," you will see that the JSMB is up and running. It has tasked my office and the intelligence community staff to create a working group to look at planned NRO programs and activities and the degree to which they support the requirements of the warfighter.

The JSMB has also, through its executive committee, participated in the decision to appoint the Air Force as the lead acquisition organization for the Global Broadcast Service.

CHART 6.—DUSD (SPACE) PROGRAM OVERSIGHT

- Space surveillance & warning systems
  - DSP
  - SBIRS
- Environmental monitoring
  - DMSP
  - NPOESS
- Navigation systems
  - Global Positioning System
- Space Launch Systems
  - EELV
  - Titan IV

  - MLV
  - RLV
- Communications systems
  - Milstar
  - DSCS
  - Global Broadcast System
  - Mobile Satellite System
  - Polar Communications
  - Advanced MILSATCOM
  - Leased SATCOM
  - Terminal programs

Mr. DAVIS. There is a lot of information on this particular chart, Mr. Chairman, and there is more detail even in my statement. But I put this up here just to show you that space is a dynamic area. You referred to the constraints on the defense budget earlier. Every one of these major categories you are looking at, space surveillance, warning systems, environmental monitoring, navigation systems, space launch systems, communications systems, has a new start that is a major program new start, either imminent or recently started, or there are major, ongoing procurement programs there, with large dollars—for example, GPS—critical to both civilian and military interests.

FY 1996 CONGRESSIONAL INTEREST ITEMS

- Space management and oversight
- Protection of Service-unique interests
- Economies and efficiencies
- Space launch modernization
- Low-cost expendable launch vehicles
- Reusable launch vehicles
- Microsatellites
- SBIRS support to missile defense

Mr. DAVIS. You referred to some congressional interest items in your opening statement, Mr. Chairman. This slide is simply a brief summary of the ones that I believe the Congress gave us with very specific direction in fiscal year 1996. I have touched on several of these in my opening remarks. I am prepared to respond to others if you have particular questions, as we get into them later.

In conclusion, I am pleased with, and as General Ashy said, proud of the progress that we have made within the space community. Everyone at this table is committed to working very closely with the Congress as we build on the progress that we have already achieved.

I thank you, Mr. Chairman. That concludes my remarks.

[The prepared statement of Mr. Davis follows:]

PREPARED STATEMENT BY ROBERT V. DAVIS

INTRODUCTION

I am pleased to appear before you to discuss the Department of Defense space activities together with General Ashy, Mr. Hall, and Major General Dickman. I would like to take the opportunity to thank this Committee for its leadership in urging and, when necessary, directing the Department of Defense to improve acquisition management of space programs and to enhance our space capabilities and their responsiveness to the warfighters. The foresight of the Committee in the area of improving space management and organization was especially clear in the Fiscal Year (FY) 1996 Authorization Bill language. We in the department are following your lead and putting in place the structure to address those issues and concerns.

The United States conducts a variety of activities to provide space support for national security objectives. DOD space forces support a wide range of requirements critical to the National Command Authority, and warfighters. The global coverage, high readiness, non-intrusive presence, and responsiveness of space capabilities provides real-time, and near real-time support for the full range of military operations in peace, Operations Other Than War (OOTW), and war.

Having been in my current position for approximately 7 months, I have had the opportunity to view the current state of space activities within the Department of Defense from a fresh perspective. One way of characterizing these activities is to find the answers to several compelling questions. These questions are:

- Do DOD space activities provide adequate support to the warfighters?
- Are we organized to provide that support in the most cost effective manner?
- Is there unwarranted duplication among the services and defense agencies within DOD and with those of the Intelligence Community?
- Where should we be going in the future?

To address these questions, the Department has made a number of changes which have the common goal of improving our internal decisionmaking process and increasing the quality of support to the warfighters. Some of these steps have been completed, some are in progress, and others are in planning. *The bottom line is that the Department's space activities are being addressed in a totally different manner—with greater efficiency—than they were when this Committee met last year.*

Before I discuss each of these steps, it would be helpful if I would state my priorities as the Department's focal points for improving space activities.

- First, and foremost, is to better organize and manage the DOD space program.
- Next is to lay out a long-term strategy of where we should be going. It is interesting that the Department spends on the order of 13 to 14 billion dollars a year in space but does not have a long-term strategy for space. We are working to change that.
- Last, is to change the way we think about space and to change the old paradigms. A good example of this is to get away from the "stovepipe" thinking of separate space communication programs like DSCS, UHF, and MILSTAR, and to move to a more "architectural" approach for military satellite communications.

ORGANIZATION

We have worked hard to address the concerns of Congress and the independent Commission on the Roles and Missions of the Armed Forces (CORM) about National Security space activities. These concerns have involved the basic processes governing defense and intelligence space programs and spanned policy, resources, requirements, acquisition, operations and support to the warfighter. These concerns did not go unheeded by the Secretary of Defense and other senior DOD managers. Proof of that is my presence here today.

To address the management of National Security space activities we have taken a two step approach. The first step is to improve the integration and coordination of all DOD space activities. The second step involves improving the coordination and integration of defense and intelligence space activities.

We have fulfilled the first step by consolidating all space responsibilities and functions within the Office of the Secretary of Defense in a single new organization under a Deputy Under Secretary of Defense for Space (DUSD (Space)). Serving in that capacity, I report directly to the Under Secretary of Defense for Acquisition and Technology, Dr. Paul Kaminski. My responsibilities include:

- serving as the principal OSD staff assistant and advisor for space matters with responsibility for DOD space and intelligence functions in terms of policy, strategy, planning, international negotiations, Congressional and governmental liaison, and integration of space capabilities into the DOD force structure.
- overseeing acquisition management and architecture planning for such programs as space launch, reconnaissance and surveillance, tactical warning and attack assessment, communications, navigation, environmental monitoring, space control, and space related R&D.

Clearly, one person cannot do all of this alone. Three Assistant Deputy Under Secretaries—Space Systems Acquisition, Space Policy, and Space Systems and Architectures—report directly to me. My office has a permanent staff of 26 people who are kept extremely busy with all the issues under our span of control. But they are also the brightest and the best so we are making a great deal of progress.

In those areas where there is a need for coordination, I share responsibilities with the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD (C^3I)), and the Director, Defense Research and Engineering. For example I have responsibility for oversight of the military satellite communications architecture but the ASD (C^3I)has the overall responsibility for the Department-wide C^3 architecture. With respect to space technology, I am responsible for assessing future space requirements and recommending changes to space-specific technology goals to the DDR&E, who retains overall responsibility for S&T programs within DOD.

With regard to better coordination of DOD and intelligence-related space, there are two evidences of this improved relationship. One is that Associate Director for Intelligence Community Affairs and I co-chair an integrated product team tasked by the Deputy Secretary of Defense and the Director, Central Intelligence, to conduct a comprehensive review of NRO programs and activities. I anticipate this activity will result in further improving the management and coordination of Defense and Intelligence space activities.

The second step is the creation of the Joint Space Management Board or JSMB. In December of last year, the Secretary and the Director of Central Intelligence signed a charter establishing the JSMB. The JSMB was formed to:

- ensure that defense and intelligence needs for space systems (including associated ground-based systems) are satisfied within available resources, using integrated architectures to the maximum extent possible,
- provide executive management for defense and intelligence space programs and oversight of the single National Security Space Architect, when that is created, and,
- integrate policy, requirements, architectures, acquisition, and funding for defense and intelligence space programs.

The Joint Space Management Board is co-chaired by the Under secretary of Defense for Acquisition and Technology and the Deputy Director for Central Intelligence. The Executive Committee of the JSMB, vested with the full authority to act for the Secretary of Defense and the Director of Central Intelligence, within the bounds of the charter, includes in addition to the Co-chairs, the Vice Chairman of the Joint Chiefs of Staff and the Executive Director, Intelligence Community Affairs. I serve as the DOD Executive Secretary of the JSMB.

The third step taken in improving the organization and management of DOD space activities was the creation of the DOD Space Architect. The Under Secretary of Defense for Acquisition and Technology formed the office of the DOD Space Architect in September 1995 and named Maj. Gen. Bob Dickman, U.S. Air Force, as its first director. This position is a 2-year minimum tour filled through a nomination process, at the 0–8 or civilian equivalent. His responsibilities include:

- developing space architectures across the range of DOD space mission areas to include space support, force enhancement, space control, and force application, and
- integrating validated requirements into existing and planned space systems architectures

All of this will be developed with the full involvement of the Intelligence Community.

One obvious question is what is the working relationship between the DOD Space Architect and other organizations. In his capacity as the DOD Space Architect, he provides support to my office, the ASD (C^3I) and other organizations, including the Ballistic Missile Defense Organization, Defense Information Systems Agency, National Reconnaissance Office, etc., in the development of architectures and master plans for which those space architectures under his responsibility will comprise a critical component.

His relationship to my office is very clear. I provide overall guidance and priorities for the areas we need to focus on. At this time, under my oversight responsibility, he has initiated architecture efforts in two areas: advanced military satellite communications and space control, and will soon start a third dealing with telemetry, tracking, and control.

My office enjoys an excellent relationship with U.S. Space Command. Everything we do in the Pentagon on space is focused on improving space support to the front line commander and to enhancing our military forces worldwide. USCINCSPACE is a member of the JSMB and, along with the Vice Chairman of the Joint Chiefs of Staff, will bring the warfighter's perspective to the process. The direct participation and coordination between USCINCSPACE and the DUSD (Space) organization, including the Space Architect and the participating agencies in the JSMB, allow USCINCSPACE to influence and contribute to the decision process affecting defense and intelligence space policy, acquisition, architecture, funding and related issues. This is the right organizational approach and we are already reaping the benefits of the warfighter's perspective as we build to the future. I am very pleased with the support and participation of USSPACECOM in the development of the DUSD (Space) organization. We are working closely together to insure the front line forces understand, can use, and have available the space forces that they need to execute their mission.

At this time I would like to cite an example where I believe the process is improved and results in better support to the warfighters. The example I will use is the Space-Based Infrared System or SBIRS. SBIRS evolved from a coordinated and fully integrated process involving all the user and acquiring communities. Through a task force led by Keith Hall, a successful approach was adopted that provided an integrated acquisition strategy to meet the warfighter's and intelligence community's needs. The Operational Requirements Document (ORD) went through a Joint Requirements Oversight Council review and approval where the key performance parameters were validated. It was recognized that two requirements were significant cost drivers: survivability and direct downlink. Before validation of each of those, it was determined that a trade-off analysis needed to be done to determine the most cost-effective solutions to each of those requirements. The process to address those trades was vetted through the acquisition channel and resulted in the creation of integrated product teams, made of those organizations who had a stake in the ultimate outcome. The results of that process were presented to a "Warfighter's Forum," chaired by Vice Admiral Frost, the Deputy Commander, U.S. Space Command and comprised of three-star level representatives from the Unified Commands, the Services, the Intelligence Community, and my organization. The bottom line is that there was complete consensus on the approach to take on what survivability and direct-downlink capability is required and is affordable. The success of this example is not only that all parties were involved in the process from the beginning, but that the time frame to reach closure was measured in months and not years. *We truly are seeing a change in the way we do business.*

THE NATIONAL IMAGERY AND MAPPING AGENCY (NINA)

A major concern of Congress and the Commission on the Roles and Missions of the Armed Services was the need to integrate Military and Intelligence space activities to more adequately support the warfighter. Another initiative we have taken in DOD towards solving this problem is the establishment of the National Imagery and Mapping Agency. Both the Defense and Intelligence communities staffed a task force over last summer to establish this Combat Support Agency which will report to the SecDef and the DCI. The NIMA charter is to consolidate the various imagery and mapping processing resources and to ensure exploitation and dissemination to users worldwide. The target date for stand-up of the new agency is October 1, 1996.

INTERNATIONAL COOPERATION

International cooperation has hit space in a big way. The national security, civil and commercial space sectors are all involved in space cooperation with other countries. The interdependence resulting from the globalization of the world economy has created exciting new opportunities for defense cooperative international development activities in space. The Department of Defense is committed to being a leader in this new era of international defense space cooperation. Our goals for these efforts are focused upon providing:

- Clear and tangible benefits for the U.S.
- Expanded levels of cooperation which could be leveraged with the objective of enhancing the support provided to deployed U.S. and allied forces
- An increased focus on international cooperation agreements of both a bilateral and multi-lateral nature, which could result in long-term growth opportunities to the U.S. space industry
- Arrangements which may cross sector boundaries (civil, commercial, national security) if mutual benefits are possible
- Protection from the inadvertent transfer of a technology or manufacturing process which would negatively effect the U.S. leadership position in a technology or industrial base arena
- Creation of protection mechanisms for the avoidance of transfer of any technology or process which could lead to proliferation of weapons systems by powers hostile to the national security interests of the United States.

I mentioned earlier that one of my goals is to be future-oriented and develop a Masterplan on International Space Cooperation. In support of the accomplishment of that task I have already met with my counterparts in France, the United Kingdom, and Australia. We also have had preliminary discussions with officials from Germany, Canada and Italy.

Bilateral discussions with the French have intensified. We are attempting to find areas of mutual cooperation that will be of benefit to both parties and avoid non-reciprocal transfers of technology. While the pace has been deliberate, the discussions are now moving towards potential cooperation in the area of Satellite Communications with a focus on Extremely High Frequency (EHF) compatibility. By pursuing this area of military cooperation with the French, we are laying the groundwork for a relationship which will foster a climate of future support in activities such as allied peacekeeping efforts by assuring that satellite communications support will be available to the forces of both countries. This initial effort has expanded into a Quadri-lateral cooperative effort also involving the United Kingdom and Germany.

Over the past several years, Space Launch Trade Agreements have been established with China and Russia and last year with Ukraine. These agreements have provided the U.S. commercial satellite industry with greater access to space. The Russian agreement was recently renegotiated in an effort to bring all three agreements to parity with the goal of promoting joint development and increased trade through international collaboration.

The President's Space Transportation Policy identified "free and fair trade" in space transportation services as the long-term goal of the United States. In pursuit of this goal, the President's policy directed that we seek agreements with other nations to define "free and fair trade"; limit unfair practices in the market place; and establish criteria for the participation in this market by countries in transition from non-market to market economies. The current agreements with China, Russia and Ukraine have been crafted ensuring the entrance of these non-market economies into the global marketplace would not disrupt the market by creating an unfair advantage over existing market providers. Our trade agreements with these non-market countries have included specific quota and price restrictions as protections against distortions in the market place.

As part of these agreements, Technology Safeguards Agreements have been or will shortly be put in place to assure that neither our satellite technology nor the foreign counterpart's launch vehicle technology is compromised. These agreements assist in everything from streamlining customs requirements to making sure that required information flows expeditiously between parties. In addition, they provide for U.S. Government oversight, currently provided by the DOD, throughout technical interchanges and launches of satellites. This interaction allows for real-time information exchange regarding the release of the necessary data to accomplish the launch.

Finally, in the area of international cooperation, we are ensuring National Security space policy is recognized at the United Nations via the Committee on the Peaceful Uses of Outer Space (COPUOS), and we are also engaged in other international fora such as the Inter-Agency Space Debris Coordination Committee (IADC).

The Secretary of Defense and the Under Secretary of Defense for Acquisition and Technology see a tremendous opportunity for developing international space cooperation efforts which would improve support to our deployed forces and provide increased market entry for opportunities for the U.S. commercial space industry.

SPACE PROGRAMS

I would now like to address some of the programmatic aspects of the DOD space program. I will focus on what I believe are the "Top Seven". Those being: Space-Based Infra-Red (includes the Space and Missile Tracking System), Evolved Expendable Launch Vehicle, Titan IV, Global Positioning System, Global Broadcast System, MILSTAR, and the National Polar-orbiting Observational Environmental Satellite System.

Space-Based Infrared System (SBIRS)

Description. SBIRS is an integrated system of global missile warning satellites which will begin replacing the Defense Support Program (DSP) constellation in 2002. It will provide greatly improved support to missile defense, whether theater or national, and will significantly enhance our technical intelligence capabilities. This critical program will serve multiple users, ranging from theater CINCs to the national intelligence agencies. The SBIRS program consists of three major phases. Phase 1, to begin in 1999, will consolidate the ground support systems of DSP in preparation for deploying SBIRS satellites. This consolidation will smooth the transition from the aging DSP system to modern SBIRS technology. Phase 2 will begin in 2002 with the launch of the first of four SBIRS geosynchronous orbit and two highly elliptical orbit satellites. Phase 3 will deploy the low-altitude Space and Missile Tracking System (SMTS) and a major block change in the high-altitude satellites to achieve an optimum "high/low" balance. Phase 3 begins in 2006, though we continue to explore options for early deployment of SMTS in support of a National Missile Defense system.

Program Status: Currently in the pre-engineering and manufacturing development (EMD) phase, with two contractor teams led by Lockheed Martin and Hughes/TRW competing to analyze user requirements, conduct design studies, and develop low-risk system concepts.

FY 1996 Program. In FY 1996, the SBIRS-High program, for Phase 1 and 2, will pass several key milestones. Following the Joint Requirements Oversight Council requirements review on 30 April, the program will enter source-selection and conduct its next major acquisition review in late August for approval to enter EMD.

FY 1997 Plan. In FY 1997, the program will begin EMD. The Preliminary Design Review will be conducted and the long-lead elements of the Phase 1 DSP ground system consolidation will be purchased.

Issues. Progress has been made in achieving a greater level of Air Force/National Reconnaissance Office integration, essential to the success of this complex joint program. A SBIRS direct theater downlink requirement has been included for theater support, system survivability, and assured data delivery. A proposal to consolidate the Army Joint Tactical Ground Station with SBIRS in a Joint System Program Office will ensure that both strategic and tactical users have available a common, mobile receive system for missile warning data.

Space and Missile Tracking System (SMTS)

Description. SMTS is the low earth orbit component of the SBIRS architecture. Its unique capability to track missiles throughout their trajectory—not just during the "hot" boost phase—allows the system to effectively cue missile defense systems with accurate targeting data. It is particularly useful to National Missile Defense and against the longest range theater missile threats. SMTS also has the potential to address other SBIRS requirements, such as Technical Intelligence and Battlespace Characterization. A SMTS constellation optimized for national missile defense would consist of 21 satellites in three orbit planes. One optimized for all four SBIRS missions would contain at least 28 satellites in four orbit planes. In the baseline SMTS program we plan a deployment decision in 2000, with a first launch in 2006. "There are earlier deployment options to support NMD, though these entail considerable cost and technical risk.

Program Status. The program is currently developing two Flight Demonstration System (FDS) satellites, which will be launched in FY 1999 for 2 years of on-orbit tests and data collection. TRW and Hughes are teamed for executing the FDS program.

FY 1996 Program. A Preliminary Design Review was successfully conducted and significantly enhanced the program by adding a Longwave IR Sensor system to the flight vehicles. Additionally, DUSD (Space), the Air Force, and BMDO developed an accelerated program option to support early NMD deployment.

FY 1997 Plan. The program will reach Critical Design Review as we firm up the flight configuration for FDS. In addition, we may add a Rockwell Low Cost Experiment (LCE) to the program for enhanced competition and risk reduction. Though offering many attractive features, the LCE may have considerable risks itself, which we will carefully weigh. One option is to fund the LCE program to Preliminary Design Review only, which will provide better insight into the technical risks before proceeding.

Issues. Acceleration of the SMTS deployment in response to Congressional interest to support an early National Missile Defense capability, would force the FDS to be down-scoped to emphasize NMD only, not a system fully capable of performing all the IR missions. Early deployment is considered a "Medium-to-High" risk option. In addition, deploying a "Block 1" SMTS in 2002 with limited orbital life will require prompt replacement in 2006 by more capable "Block 2" satellites, thus leading to costly back-to-back deployments. The program can be accelerated if directed, but a well-balanced, less-risky SMTS deployment in 2006, as envisioned in the current baseline program, would be more prudent.

Evolved Expendable Launch Vehicle (EELV) System

Description. The EELV program is a "System of Systems" approach toward reducing the life cycle costs associated with space launch. In response to the President's Policy on Space Transportation, signed August 5, 1994, DOD initiated the EELV Program with the objective of reducing launch costs by at least 25 over current systems, with a goal of up to 50 percent. The EELV system includes a family of launch vehicles, an upper stage (if required), launch facilities (pad, processing, etc.), and range facilities. The program has three phases: (1) Low Cost Concept Validation, (2) Pre-Engineering Manufacturing & Development (EMD) and (3) EMD. Phase 3 will conclude with an initial operational capability at both coasts for the EELV family of launch vehicles. The EELV Initial Operational Capability (IOC) for medium launch systems is 2001. Heavy launch IOC is 2005.

Program Status. Phase 1 contracts were awarded in August 1995 to four competing contractors: Alliant TechSystems, Boeing, Lockheed Martin, and McDonnell Douglas.

FY 1996 Program. During FY 1996 the contractors will mature the vehicle design and life cycle cost estimates. They also will perform risk reduction activities specific to their vehicle concepts in preparation for submission of proposals for Phase 2, scheduled for September 1996. Vehicle contractors must complete a Tailored Preliminary Design Review and submit a program life cycle cost estimate at the 70 confidence level prior to Phase 2 proposal submission.

FY 1997 Plan. Phase 2 will begin in December 1996 with a downselect from four to no more than two competing contractors who will conduct pre-EMD for a 17-month period. Work will "emphasize maturing system designs to support delivery of Critical Design Review packages and updated life cycle cost estimates (90 confidence level) for the June 1998 downselect to a single contractor.

Issues. During Phase 1, the contractors identified a mismatch between their required funding profiles and DOD's proposed budget. DOD addressed this issue by moving funding forward from the out years into the FYDP and reducing the low risk payload flights for the medium lift vehicle from two to one. Both DOD and the contractors support these changes as significant risk reduction measures regarding the program's overall cost.

Titan IV System

Description. The Titan IV space launch system provides heavy lift capability for the highest priority, national security payloads. To date, 14 Titan IVs have been successfully launched. A block change to improve reliability, replace obsolete components, increase flexibility, and comply with range safety requirements is underway, designated Titan-IVB.

Program Status. The current program consists of a 41-vehicle contract, which includes 15 vehicles in the Titan-IVB configuration. Congress approved, in the FY 1996 Defense Appropriations Act, procurement of up to six additional Titan IV vehicles (total of 47) to support DOD requirements. DOD has evaluated the heavy lift needs and identified a maximum requirement for five additional vehicles. The current plan is to procure three vehicles, with an option for two additional vehicles for assured access to space, if required, during transition to the EELV system. This option must be exercised by FY 1999, which follows the EMD downselect to one contractor for the EELV program.

FY 1996 Program. In FY 1996, the Titan IV Program has successfully launched two vehicles and is scheduled to launch three more before year's end. A procurement strategy for five of the six Congressionally approved additional vehicles is being developed for DOD approval in April 1996. A Request for Proposal will then be released for the additional vehicles.

FY 1997 Plan. Contract award for the additional vehicles is planned for the first quarter of FY 1997. Four Titan IV vehicles are scheduled to be launched including the first Titan-IVB.

Issues. DOD is continuing to evaluate the heavy lift requirements for the additional five vehicles in order to minimize the costs associated with continuing the Titan IV program and to ensure the most efficient transition to the EELV family of vehicles.

Navstar Global Positioning System (GPS)

Description. Navstar GPS is a space-based positioning and navigation system designed to provide worldwide, all weather, passive, three-dimensional (3–D), position, velocity and timing data to U.S. and allied military users. GPS provides a 3–D military accuracy specified at 16 meters (currently delivering military accuracy of approximately 10 meters) and a variable civilian accuracy set to 100 meters in peacetime. GPS supports virtually every mission area for all military services and is proving to be of tremendous benefit to civilian users in virtually all areas of public and private transportation and commerce. The basic GPS, as implemented by the DOD, consists of three segments: space, control, and user equipment.

Program Status. The operational constellation of 24 Block II satellites, procured from Rockwell, International, was fully deployed in March 1994. Four Block II satellites remain available for launch as replacements for any operational satellites that fail prior to launch of the first Lockheed-Martin Block IIR replenishment satellite in September 1996. Procurement of a family of user equipment to incorporate

GPS into a host of military platforms and missions is well underway. Major suppliers of user equipment are Rockwell-Collins, Trimble Navigation, E-Systems, and Interstate Electronics.

FY 1996 Program. Procurement of Block IIR is continuing while the satellite control segment is being upgraded in preparation for launch of the first replenishment satellite. Twenty-one Block IIR spacecraft will sustain GPS coverage through 2001. A Request for Proposals has been issued for competitive procurement of Block IIF satellites to provide continuation of service beyond 2001. Contract award for development and procurement of Block IIF is expected in April 1996. The Block IIF contract will permit procurement of up to 33 satellites under a combination of multiyear contracts. A plan for future system improvements will be presented to the Congress by May 1, 1996, in accordance with the FY 1996 Defense Authorization Bill.

FY 1997 Plan. Manufacture and launch of Block IIR satellites and procurement of Block IIF satellites will continue, as will installation of GPS user equipment, to meet a completion date of the year 2000 directed in the FY 1994 Defense Authorization Bill.

Issues. The dual military/civil utility of GPS is advantageous for U.S. taxpayers, but is also a source of tension because of its potential for non-peaceful use around the globe. At its most precise level of accuracy, GPS is useful for both targeting and delivery of weapons. The DOD has attempted to deter non-peaceful use of GPS by employing a security feature called Selective Availability which results in the nominal 100 meter direct civil accuracy. This feature has been a controversial issue with many civilian users of the system, but we continue to support its use as a mitigation against indiscriminate proliferation of a much more precise signal (10 meters or better) should Selective Availability be removed. DOD has also participated in an interagency process during the past year which will result in a national policy statement on GPS to be issued by the President in late March. The statement will provide the basis for U.S. support to GPS and for its availability to support national security and national, as well as international, scientific and commercial endeavors.

Global Broadcast Service (GBS)

Description. GBS is a program to procure a high speed, high capacity, super high frequency (SHF) digital information transmission system based on the commercial technologies developed for the current generation of satellite direct broadcast television services. It will provide worldwide, high data rate connectivity with unprecedented dissemination capabilities to a distributed set of users through small aperture receive antennae and highly mobile terminals. GBS will allow simultaneous transmission of various data such as imagery, logistics, weather, maps, operational orders, and telephone and television service to multiple receive locations within a given spot beam footprint. At lower data rates, information can be transmitted to larger, broad area coverage beams. The GBS system is comprised of four elements: an information management segment, a broadcast management center, a space segment, and user receive terminals. The program contains three phases: (1) lease of existing commercial satellite transponders over the U.S. during 1996–1998 for concept of operations (CONOPS) development, (2) fielding of an interim system by adding GBS payloads to the Navy's UHF Follow-On (UFO) satellites 8, 9 and 10, and building a prototype ground broadcast management system, and (3) fielding of an objective, worldwide GBS capability to be determined by the DOD Space Architect to meet the full set of broadcast requirements.

Program Status. Phase 1 leased service activities are underway. The contract to add GBS payloads to UFO satellites 8, 9, and 10 was recently signed allowing the engineering and production efforts for the space segment of the interim system to begin in time to support a UFO 8 launch in 1998.

FY 1996 Program: Phase 1 leased capability will be used to refine the GBS CONOPS in support of the prototype ground broadcast management system definition. UFO GBS payload engineering, parts procurement, and production efforts are being conducted for deployment of the Phase 2, interim capability. The remainder of the FY 1996 funding will be used to support CONOPS development activities, begin development of the high speed data encryption hardware, initiate engineering trade studies for broadcast management, and the Phase 3 space segment.

FY 1997 Plan. The FY 1997 program includes final integration and testing of the UFO 8 GBS payload, and production, integration, and testing of the UFO 9 and 10 payloads. The R&D activities begun in FY 1996 will continue. The ground broadcast management segment acquisition will be initiated.

Issues. The current program requires an Above Threshold Reprogramming approval from Congress to complete the FY 1997 program. If not approved, the current $30 million investment is at risk. The UFO contractor, Hughes, requires funds by

April 1996 to continue the effort. Additionally, the DOD Space Architect must achieve sufficient third-phase program definition to support timely and effective FY 1998–2002 budget development.

MILSTAR

Program Description. The MILSTAR Satellite Communications System is a joint service program to procure the MILSTAR Extremely High Frequency (EHF) satellite, its mission control segment, and new or modified communications terminals for assured communications to crucial tactical and strategic users. MILSTAR will provide a survivable, jam-resistant, world-wide, secure communications system to meet minimum essential wartime communications needs for command and control of tactical and strategic forces. In response to Congress, DOD extensively restructured the MILSTAR program over the past 4 years to reduce costs and account for changes in the international and national security environments. Requirements for a classified payload and Cold War survivability features were eliminated. The number of satellites and ground control elements were reduced commensurate with the threat and force structure reductions leaving a current program comprised of two MILSTAR I and four follow-on, MILSTAR II satellites. MILSTAR II incorporates a Medium Data Rate (MDR) payload which will greatly increase communications capacity compared to the Low Data Rate capabilities of MILSTAR I.

Program Status. The first MILSTAR I satellite was launched in 1994 and successfully completed all initial testing. During a planned break in testing, it was used to support Operation Restore Democracy in Haiti and has since been put into full operational service. The second satellite was launched in November 1995, has completed much of its planned testing, and will become fully operational by the end of this month. On December 15, 1995, a critical milestone was achieved when the first satellite-to-satellite message using the MILSTAR crosslinks was sent. The first MILSTAR II will be launched in 1999. Lockheed is the prime contractor for the MILSTAR satellite. TRW and Hughes are the principal subcontractors.

FY 1996 Program. During FY 1996, satellite #2 will complete on-orbit testing. Production of the MDR payload for satellite #3 will be completed while satellite #4 MDR payload manufacturing will begin.

FY 1997 Plan. FY 1997 funds will be used to continue on-orbit operation of satellites #1 and #2, start satellite #3 integration and testing, complete the production of the satellite #4 MDR payload and bus, and start satellite #4 integration and test.

Issues. The Air Force reduction of FY 1997 funding for the Titan IV program will delay the launch of MILSTAR #6, currently scheduled for FY 2002, by 6 to 12 months.

National Polar-orbiting Operational Environmental Satellite System (NPOESS)

Description. NPOESS will provide space-based remotely sensed cloud imagery, temperature and moisture, and other meteorological, terrestrial, climatic, oceanographic, and solargeophysical data as well as sensor support for search and rescue. It combines the follow-on programs for DOD's Defense Meteorological Satellite Program (DMSP) and NOAA's Polar-orbiting Operational Environmental Satellite (POES) Program into a single, national environmental satellite system consisting of a three-satellite constellation. Satellites for one of the orbit planes will be provided by the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT). Satellites for the remaining two orbit planes will be provided by the U.S.

Program Status NOAA, DOD, and NASA are implementing the President's May 1994 direction to merge the POES and DMSP follow-on programs into the single, national NPOESS program and to capitalize on NASA's Earth Observing System technologies. The agencies have established an Integrated Program Office (IPO), staffed by members from all three agencies. In May 1995, the Secretaries of Defense and Commerce and the NASA Administrator signed a Memorandum of Agreement (MOA) that defined agency and IPO roles and responsibilities and established a Triagency Executive Committee (EXCOM) for program oversight. The IPO is responsible to the EXCOM for program success. DOC is the lead agency for overall program execution and operation. DOD is lead agency for acquisition and NASA for technology transition.

FY 1996 Program. The Triagency EXCOM recently agreed to review the NPOESS program plan in light of the continued robust health of the on-orbit constellation and the current DMSP and POES satellite inventory. As a result, the Defense Acquisition Executive directed postponement of the April 1996 acquisition milestone decision, withdrawal of the draft solicitation, and development of a revised program focusing on early sensor development and risk reduction. The NPOESS System Program Director will present a detailed program plan to the EXCOM for approval in July 1996.

Issues. The NPOESS program was created to reduce the cost of acquiring and operating polar-orbiting environmental satellite systems, while continuing to satisfy established civil and military operational requirements. Part of the savings to the U.S. result from using the EUMETSAT satellite, since the U.S. would provide only the NPOESS instruments, avoiding the spacecraft, launch, and operating costs. NOAA is leading negotiations with EUMETSAT for an agreement on EUMETSAT satellite operations during 2001–2010. This initial agreement does not cover EUMETSAT satellites that will carry NPOESS instruments, but it does encompass the time when one of the current DMSP satellites will no longer be operational, thus effectively making the EUMETSAT satellite in a similar orbit part of the three-satellite NPOESS constellation. There are still issues to resolve, but this agreement should be ready for final approval this year.

DOC and DOD committed to jointly provide a total of approximately $1.4 billion in FY 1996–2001 for NPOESS. The resulting funding profile was front loaded with DOC funding because NOAA has an earlier need date for an NPOESS satellite. DOD funding will increase in later years to bring the total program fund sharing to 50/50 and eventually to so/so annually.

SUMMARY

In summary, again I appreciate the opportunity to testify before the Committee. I am pleased with and proud of the positive changes that occurred over the last year within the space community. Though funding levels are somewhat restricted these days, I will continue to strive to obtain the maximum technical and programmatic accomplishment with those funds. Or more succinctly stated "to get the most bang for the buck". I also will work very closely with this Committee as we build on the progress we have already achieved. I look forward to the next occasion to testify before the Committee.

Senator LOTT. Thank you very much, Mr. Davis.

We will make of course all of your prepared statements a part of the record. Feel free to use it in whole or in part. Let's see, Mr. Hall.

STATEMENT OF KEITH R. HALL, ACTING DIRECTOR, NATIONAL RECONNAISSANCE OFFICE

Mr. HALL. Thank you, Mr. Chairman. As you indicated, I am the Acting Director of the National Reconnaissance Office. I should note also that I have been in that position for only 3 weeks, and I suspect that your ability to ask good questions will far surpass my ability to provide good answers, but I will do my best.

I have a few summary remarks from my prepared statement.

Our satellite reconnaissance systems have played a vital role in our national security since their inception in the 1960's. They have, in many ways, literally been the eyes and ears by which the United States monitors significant developments abroad. Yet these systems have evolved over the years.

In the beginning, given the relative immaturity of both collection and information-handling technology, these systems were first used to support national policymakers and military planning. Information came in too late to be of value supporting current operations. Over time, however, as technology matured, the ability of these systems to support current activities has improved dramatically, making the potential number of customers which can benefit from these systems expand.

A second factor which has affected our customer support is the changing security environment that attends our systems. Indeed, not too long ago, it would not be possible for me to appear overtly as a member of the National Reconnaissance Office because we never acknowledged, as a country, that such an office existed or that we had these capabilities, other than in very general terms, such as reference to national technical means.

In the beginning, the fact that the U.S. possessed such capabilities was known to a relatively handful of senior personnel, mostly in Washington. Over time, this too has changed, until today the fact that we possess such capabilities is openly acknowledged, as is the fact that they consist of both photo-reconnaissance capabilities and, in the last few months, we have acknowledged formally the fact of signals intelligence capabilities in space.

Moreover, the data that these systems provide has also been significantly reduced in their classification levels. Once entirely held at the sensitive compartmented information level, and thus available only to those with the highest security clearances operating in highly secured environments, today our information is increasingly disseminated at the secret level and, when necessary, even released to our coalition partners—things that were unheard of just a few years ago.

This is a result of changes in both technology and security. Our user community is no longer limited to the policymaker or military planner. Indeed, today it is a matter of routine for NRO products to be rapidly placed in the hands of tactical military commanders deployed in operations around the world.

Along with our technical and security accomplishments, which have enabled us to increase our support to the military, the NRO has taken significant strides over the past several years to better connect our system capabilities with our military users. Let me just discuss a few of these areas.

First, in April of 1990, we created the position of Deputy Director for Military Support in the National Reconnaissance Office. The fourth individual to occupy that position is with me here today, Brig. Gen. David "Bull" Baker. Like his predecessors, Bull is an operator and strives to work with both the military and NRO communities to improve our support for military capabilities.

The second key effort was the creation of our Operational Support Office, which, under Bull's direction, provides direct and timely interaction, to include operational training exercise support, with the Joint Staff and the military commands, and provides support to a variety of inter-military service initiatives to exploit our national capabilities, called TENCAP. Military efforts to train as we fight have led us to dramatically increase our participation in exercises.

In 1992, we participated in estimating 20 such exercises. This year, fiscal year 1996, we are scheduled to participate in 80.

Third, we are cementing close and cooperative relationships with U.S. Space Command. Though only in my job for 3 weeks, General Ashy and I have already spoken on two occasions on ways that the NRO can work cooperatively with Space Command to provide better support to the warfighter.

Finally, as Mr. Davis indicated, the recent formation of the Joint Space Management Board, and indeed, Mr. Davis's office, the Deputy Under Secretary of Defense for Space, assures that an organizational mechanism will exist at the top to provide complete integration in the intelligence and defense communities' use of space in the most cost-effective manner.

So, in conclusion, Mr. Chairman, we are proud of the NRO for the long record of accomplishment, dating some 30 years, and delivering vital national security space capabilities. Also, we are also proud of our growing support to a growing number of users, including a significant expanding number of military users. We are committing to working closely with our customers, defense space managers and military commands to continue to provide improved services in a cost-effective manner.

I will be happy to take your questions at the appropriate time. Thank you, Mr. Chairman.

[The prepared statement of Mr. Hall follows:]

Prepared Statement by Keith R. Hall

Good afternoon, Mr. Chairman and members of the committee. I am pleased to be joining Mr. Bob Davis, General Ashy, and Major General Dickman today in presenting my views on current efforts to improve the oversight and management of our national security space sector. A common concern and goal we all share is the efficient and effective development and use of one of our Nation's most sophisticated and prized technologies, space systems. Satellites today contribute to a wide facet of national and international issues, and influence everything from national security decision making, crisis management, military operations, humanitarian relief, global navigation, weather forecasting, and near instantaneous communications around the world. What was considered a new and revolutionary use of space, even 10 short years ago, has become routine and commonplace today.

As satellites and the information products they provide become more closely integrated and intertwined with our daily lives, our dependence on space has increased commensurately. Today, military commanders think of global communications access, all weather; day/night precision navigation, accurate weather predictions, and timely early warning as part of their Kit Bag when deploying to a theater of operations. Placing United States forces in harm's way without a full repertoire of space capabilities would be unthinkable. So, too, intelligence space systems play an integral role in helping our military commanders and national policy makers in both the evaluation of international events which could lead to political crisis or supporting military intervention. Government negotiators, diplomats, and official representatives all rely on space for critical insights which help to forge and maintain the peace in an increasingly strife ridden world.

Commercially, space and its information links have become the superhighway for economic growth. Precise navigation has opened new corridors for airline traffic; communications satellites have been the catalyst for the information revolution; and recently declassified historical satellite imagery will afford the opportunity for a global evaluation of environmental trends and new remediation projects. Emerging commercial markets such as remote sensing, global cellular communications, and small launch vehicles also hold the potential for national security space applications, as well as new business development.

This new national and international dependence on space carries with it a responsibility to effectively manage all aspects of our space programs and activities. We simply cannot afford a misstep in program direction or a missed opportunity for complete coordination with all relevant organizations and agencies. As you are well aware, this is a daunting task. The complexity of space technologies and systems integration, rapidly expanding user needs and proliferating space capabilities, and a heightened awareness by the American people as to the costs and benefits associated with our national security space program, all speak to the need for an accountable, overarching management forum to oversee and direct our space activities.

The first important step down this path was taken last December when the Director of Central Intelligence and the Secretary of Defense chartered the new Joint Space Management Board—JSMB. As stated in its charter, the purpose of the JSMB is to "ensure that defense and intelligence needs for space systems . . . are comprehensively satisfied within available resources, using integrated architectures to the maximum extent possible." This executive management body will be responsible for the overall policy, program guidance, and systems-level trade-off analysis necessary for proper apportionment of constrained resources to the national security space sector.

As a member of the JSMB, the Director of the NRO will actively participate in the dialogue between the Intelligence and Defense communities on customer needs, the best possible mix of space capabilities to meet those needs, and development of sound programmatic guidance. Integrated architectures is an important element of this process, and the NRO's Director of Plans and Analysis serves the JSMB in this ex-officio capacity alongside the Department of Defense Space Architect.

Major General Dickman presented you with his blue print for military space and a consolidated defense space architecture. The NRO also plays a role in that process. Our action officers, senior field grade officers, and general officers and senior civilians are participating in the military satellite communications and space control architecture development teams. One of our senior field grade officers is also co-chairing the space control protection panel and will address issues of space systems survivability, vulnerability, and mission risk across both the NRO and defense space programs. The results of these architecture development teams will be presented to the JSMB and represent our first integrated look at various space architecture options.

We have also undertaken an officer exchange program with both the Defense Space Architect's office and the Deputy Undersecretary of Defense (Space). These exchanges will help in the development of future integrated architecture efforts and the new National Security Space Master Plan.

In addition to these integrated architecture initiatives, the DCI and the Deputy Secretary of Defense have asked the JSMB to conduct a comprehensive review of NRO programs and activities. The focus of the review is to evaluate the NRO's "ability to reliably meet critical requirements without interruption over the next 10 years." We are currently in the process of developing a terms of reference for the JSMB directed review with the Office of the Under Secretary of Defense (Space). Once we clearly understand and define the appropriate process for determining and fulfilling national and military space intelligence requirements, apportioning resources between Intelligence and Defense, and bench marking our progress against customers needs, we will have taken a giant stride towards the eventual goal of a National Security Space Architect and true efficiency of space program management.

SUMMARY

Our charter from the Congress and the American people is clear: produce and operate space systems which fulfill the full range of national security requirements, and do so in the most affordable and effective manner possible. The NRO is a full partner in this process and we are well equipped to meet the challenges of the future.

I appreciate the opportunity to submit my written statement to your committee. I will be glad to respond to any questions or comments you may have.

Thank you very much.

Senator LOTT. General Dickman.

STATEMENT OF ROBERT F. DICKMAN, MAJOR GENERAL, USAF, SPACE ARCHITECT, DEPARTMENT OF DEFENSE

General DICKMAN. Mr. Chairman, I am pleased to be back with you, although wearing a different hat, to report on our progress with respect to the architecture since we met last year.

The Architect's Office was formally established at the end of September. It was the product of a long staff process that involved the operational and acquisition leadership from all four services, the CINC, the Joint Staff, and the OSD staff as well. The Office consists of approximately 40 persons, including administration and security. We are located at the Hoffman Building, blessedly outside the Pentagon. My deputy is a Marine colonel. My three division chiefs are from the other three services, Army, Navy and Air Force.

Organizationally, as Mr. Davis mentioned, we are essentially a line office, working for Dr. Kaminski. Mr. Davis's office provides the interface to the OSD staff and the Joint Space Management Board, as well as overall guidance on architectures, that is, the areas to address, the scope of our studies, additional tasks that either Mr. Davis needs for his work or directly in support of Dr. Kaminski. In terms of execution, we do work directly for the Under Secretary.

U.S. CINCSPACE is our principal interface with the warfighter. General Ashy and his staff worked very hard to adapt his requirements process and his long-range vision process to support the architecture work. Most significant in that I think is perhaps the broad use of the Capstone Requirements Document, first introduced with the Space-Based Infrared Program about 18 months ago, as the basic document for all architectural work.

While warfighters are obviously our eventual customers, the service acquisition agents are enormously involved in the products that we develop. Therefore, we maintain very close ties with the three service acquisition executives, as well as the Director of the BMDO.

Our approach to architecture development begins with a broad-based data gathering to capture requirements, to meet with industry, to understand what the technological opportunities are, and what opportunities there may be for acquisition reform. Following that, we develop sets of architectural alternatives that are narrowed through our own technical analysis, and then through fairly detailed warfighter assessments of their military capability. From that, we will take that product to the JSMB, the Joint Space Management Board, for their review and selection of an alternative.

We are about two-thirds through our first architecture, so I speak with some optimism that is not yet borne out by data—6 months into a 9-month evolution. We will brief MILSATCOM to the Joint Space Management Board at the end of July.

MILSATCOM, in fact, demonstrates our joint architecture approach. We have a dedicated team that is working on the architecture either full-time, particularly the people from my office, or as a major part of their duty, from other organizations. Six of my people are involved, 3 from the Navy, 2 from the Army and 1 Marine, plus a representative full-time from the U.S. Space Command, 3 from the Army, 4 from the Navy, 10 from the Air Force, 2 from the Defense Information Systems Agency, 1 from NASA, and 1 from the NRO. The team leader is a Navy captain.

I think from that distribution it should be relatively clear that the Air Force does not dominate the process or the population of the study groups.

The larger group that reviews the work meets on a monthly basis, and it includes representatives from each of the military departments, plus 18 other defense agencies, ranging from the Defense Airborne Reconnaissance Office to Mr. Page's ASD(C3I) organization.

We have had excellent support from the services, both in manning the office and in providing the initial work to do the architectural products themselves. I am confident that the products, first, MILSATCOM, then Space Control, then moving on to satellite operations and then whatever tasks we receive through Mr. Davis, will reflect the best, most innovative ideas the Department is capable of producing.

I look forward to any questions you and Senator Bryan may have on our process.

[The prepared statement of General Dickman follows:]

PREPARED STATEMENT BY THE DOD SPACE ARCHITECT

Good afternoon Mr. Chairman. Thank you for the opportunity to discuss the DOD Space Architect office and our initiatives in space architecture planning and development.

We are doing something unprecedented in DOD space management ad planning and I will provide you a status report.

Under the direction of the Under Secretary of Defense for Acquisition and Technology, and in close cooperation with his new Deputy Under Secretary of Defense for Space and the United States Space Command, we are institutionalizing the planning and development of DOD space architectures. The evolving post-Cold War international threat and the United States role in the international environment warrant new and innovative approaches to doing the job in the space area. In the area of military space architectures, the new DOD Space Architect is taking the lead.

Establishing the new office has been a team effort, and broad service, agency and field organization cooperation has made the difference. The DOD Space Architect is a jointly-staffed organization with forty military and DOD civilian personnel ad a mix of FFRDC and contracted technical expertise. Like a building architect who establishes a blueprint for construction, we have started the process of establishing a "blue print for military space"—a consolidated space architecture. This is a new approach for the DOD, and we are essentially starting from scratch in this area. The Department has pursued individual architectures for elements of military space in the past within selected space functional areas—communications, missile warning, positioning, and weather for example. The majority were accomplished on an individual, program-by-program basis. The very capable space systems we have today are a product of these earlier efforts, and they continue to serve the national security community very well. However, many of these systems remain unique to specific space mission areas and lack the potential cost and military utility benefits which could derive from cross-program and cross-mission area integration in a broader context.

Today, increased dependence for space by the warfighter, new technology, acquisition reform, and advances in the commercial sector support reconsideration of many of the military-unique solutions we have implemented across our space mission areas. Overall, we are taking a major step away from the approach of emphasizing current programs, traditional follow-ons and "system-centric" thinking. We are taking the first "broad-brush" look across the entire spectrum of capabilities, potential areas for improvement and integration, where to invest for the future, and make "tough" trade decisions. We will continue to look at military uniqueness where appropriate, but we are broadening our vision to assess the full range of technologies and potential solutions across the military, civil and commercial space industrial base, and projecting the realm of the possible into the next decade and beyond.

We are implementing a new process to do this—an incremental, building block approach for DOD space architecture development. We will look at individual space functional areas first, but within the process, we will focus on cross-space-mission area integration, non-system-specific alternatives, economies and high-payoff areas through trades in cost, schedule, risk, and military utility.

Within each space functional area, we begin the process by working closely with U.S. Space Command, the Joint Staff and the Services to understand the requirements. Then we develop architecture alternatives that are sufficiently different in capability, cost and other key criteria to provide DOD decisionmakers the flexibility to optimize investment, acquisition and procurement of future space capabilities.

This focus will be carried through multiple functional architecture developments and guide our DOD space planning for the future. It will be our "blueprint" for the future, to help guide the decisionmaking process that will lead us into the next century in DOD space and provide a cornerstone for the Department's Space Master Plan. This master plan will be the "bridge" between current and planned capabilities and force structure, and the far-term. It will integrate with other information, intelligence, and weapons architectures, for example, the Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance architecture under development by the Department to consolidate and guide planning and investment in the C^4I area.

Interest and participation in this new process have been overwhelming. For MilSatCom alone, over thirty Service, agency and field organizations and more than sixty personnel are represented on both the core architecture planning and architecture review teams. With that in mind, I would like to briefly summarize our architecture development team process and the status of the two architecture development and planning efforts we have underway.

For Military Satellite Communications, our architecture development effort began in October 1995, led by a senior Navy officer supported and by a multi-service staff with a wide mix of space and warfighting expertise. We have looked at the future threat, warfighting requirements, warfighting doctrine, technological opportunities, current and planned programs, and what the Services and CINCs believe the future will look like and how they will fight. We are developing alternative architecture approaches and will begin analysis, modeling and costing efforts over the next sixty (60) days. We are on track to complete this architecture effort by July 1996.

We are also starting work on Space Control, and a senior Army officer is leading the architecture development effort. There is growing concern with international proliferation of space capabilities, increased international access to space, dependence on space capabilities by the United States and its allies, and the potential for interference with access to space. We are evolving concepts on how we would approach space much in the same way we think about air and sea control.

For the Space Control architecture development effort, we have brought together the right mix of organizations, agencies and experts to participate in the process. With U.S. Space Command, we are refining the baseline requirements, and will soon begin to assess, in broad terms, alternative architectures to guide decisionmaking and investment strategies to fulfill the mission for the future. We are on schedule to complete the architecture development by the end of September 1996.

To summarize, we have a new process in place for building the DOD space blueprint for the future in a joint environment, and we are doing the right things to make it work. Considering its large constituency, widespread interest, and its critical importance to our overall C^4I infrastructure, progress in MilSatCom up to this point has been very good. We are not far enough along in Space Control to assess progress, but I am convinced we will be equally successful.

We have taken a decisive step in consolidating architecture planning and development in the new, joint DOD Space Architect office, and I am confident we have our arms around a process that will prove its worth in providing the structure to guide our planning and implementation for DOD space capabilities into the next century.

Thank you for this opportunity to tell you about our progress in implementing the Department's Space Architect office.

Senator LOTT. Thank you, General Dickman.

General Ashy, you get a second bite at the apple here.

STATEMENT OF GEN. JOSEPH W. ASHY, USAF, COMMANDER IN CHIEF, U.S. SPACE COMMAND

General ASHY. Thank you, sir. I really do not have anything to add, other than to say it is great to have the opportunity to appear here with these team members. We got the message. Now we see it coming to fruition. Moreso, I think that is really an important message this morning; that we have received that message and the elements are in place, like Mr. Davis said and Bob Dickman talked about. We have started a great relationship with the NRO. Moreso it is really important that we work together. One of those elements, the Joint Space Management Board, helps us to enhance this relationship.

Bob talked about the business that he is in, and Mr. Davis and I have discussed this a lot of times. It is really helpful from my perspective in the operational business and working with the other CINC's that we have now an organization that can deal with the policy and the coordination of it. We can better fulfill our responsibilities with regard to articulating the operational requirements, and then Bob can take them and provide an architecture leading to a fielded, effective piece of capability.

So, again, I really appreciate the opportunity to sit here with my colleague team members, and look forward to your questions.

Thank you, sir.

[The prepared statement of General Ashy follows:]

PREPARED STATEMENT BY GEN. JOSEPH W. ASHY

Mr. Chairman and members of the Committee, I am honored to appear before this sub-committee as Commander in Chief U.S. Space Command (USSPACECOM). We're proud of the fact that we have blended the men and women from all four Services into this unique unified command.

In this 10th year after the Goldwater-Nichols Act, we believe our joint space organization is the right structure for today and for the future. U.S. Space Command, including our three Components—Army Space Command, Naval Space Command, and the 14th Air Force—are a cohesive team organized and focused on providing the right support to the National Command Authorities and to every Unified Commander-in-Chief around the globe. As a result, the benefits that space provides are available to our land, sea, and air forces, as well as to national, civil and, in some cases, commercial users.

Much has changed since I last appeared before you, and I am pleased to report on our accomplishments. In this regard, I have two main messages today. The first is to highlight the increased readiness of the current space force structure and how it contributes to enhancing military operations. The second is to convey how we are preparing for the 21st Century to sustain the U.S. strategic advantage in space and meet the challenges we foresee.

IMPORTANCE OF SPACE

It has been said that space is the ultimate high ground. Throughout history, military commanders have recognized the inherent advantages of controlling the high ground. Originally, a terrain feature provided this vantage point; later, in the 20th Century, airplanes assumed this role. Today, the ultimate high ground is space. Traditionally, land, sea and air comprised the operating media of the military. The latter decades of the 20th Century have witnessed the emergence of a fourth operational medium for the military—space. The use of space and control of this space medium are essential to today's military operations. Although the preponderance of our space assets are provided by the Air Force, forces in the field from every Service depend equally on space support to their operations. The way we are organized as a unified command both complies with Goldwater-Nichols and provides for support of both functional and service entities in our unified command structure. I believe we have done this correctly and effectively.

STRATEGIC LANDSCAPE

Since the end of the Cold War, there has been increased emphasis on employment of our military force, either unilaterally or in multinational coalitions, in a wide variety of new missions. This often requires deployment to areas that lack the information infrastructure necessary to support those operations. Also, the imperatives of a smaller military force and rapid technological advances have coincided, leading our defense planners to shift emphasis to joint operations, precision weapons, and information dominance as the hallmarks of a 21st Century fighting force. Our national security policy of engagement and enlargement has committed us to redouble our efforts to tackle global problems of arms control, transnational terrorism, international crime, and the spread of weapons of mass destruction. Although the Cold War is over, we cannot completely ignore the strategic nuclear capabilities that still exist in Russia and china. Additionally, our national interests could be threatened by countries such as North Korea, Iran, Iraq, or Libya who seek to benefit from the proliferation of weapons of mass destruction and purchased technology.

Strategic arms reduction treaties and other arms control initiatives hold the promise of deep cuts in Russian strategic nuclear forces. Destruction of missiles and silos within Russia under the START I Treaty is well underway. We feel that Russian intentions with regard to nuclear conflict have changed, and we applaud that change. In fact, we hosted General-Lieutenant Anatoliy Perminov, the First Deputy Chief of Staff of Russia's Strategic Rocket Forces, on a visit to Air Force Space Command's ICBM facilities. However, large nuclear arsenals still exist in Russia, and the long-term political environment is not clear. In order to assure our security, we must not only consider intent, but also capabilities.

With regard to capabilities, Russia continues to place great importance on its strategic nuclear forces. It is modernizing the land-based missile force, progressing toward operational capability of its newest ICBM. Training deployments to the waters near our coastlines have included their quietest attack submarine, the *Akula*. They have also shown a commitment to maintaining a modern, flexible, strategic bomber force. In the future, Russia's strategic forces will be smaller, but capable.

China is also enhancing its military capabilities, especially in the ballistic missile area. Last summer and this winter, China launched a number of ballistic missiles to an ocean area north of Taiwan. The threatened use of ballistic missiles is clearly part of their current posturing. In addition to being capable of threatening neighbors, China continues to develop its ICBM force with mobile ICBMs and the addition of the CSS–4 missile, capable of reaching the U.S.

Though Russia and China have the capability of threatening our homeland today, we also face the threat that ballistic missiles will be used against our forces or our allies around the world by a growing number of countries. More than 20 nations have acquired ballistic missiles or are in the process of doing so. Recent tensions over nuclear weapons production between North Korea and the U.S. illustrate the complex diplomatic, political, and military challenges posed by this proliferation. Many of the nations which currently possess ballistic missiles are believed to be seeking nuclear, chemical, or biological warheads for them. Most of these missiles are derivatives of the Soviet-designed SCUD. Upgraded, longer-range versions could be deployed by the year 2000, but most will continue to have ranges of less than 1000 kilometers.

The development of cruise missiles, especially those designed for launch from seagoing vessels, is another concern. Cruise missiles—fitted with nuclear, chemical, or biological warheads are difficult to detect and track. The regional threat of such weapons is here now. In the future, they could threaten North America.

MISSIONS

USSPACECOM is assigned mission in four specific areas: space forces support, force enhancement, space control, and force application.

Space Forces Support

Space Forces Support includes those actions required to put satellites in orbit (launch) and to keep them operating (satellite control). USSPACECOM and 14th Air Force are responsible for military expendable launch vehicles and for supporting commercial launches from bases at Vandenberg and Patrick. Currently, there are four major military spacelift vehicles in the inventory. We use the Titan IV for heavy lift and the Atlas IIA, the Titan II, and the Delta II for medium lift. Over the last 12 months, all DOD launches achieved orbit.

To improve the timeliness of launches we have changed the way we do our launch scheduling so that the launcher, customer, builder, and acquirer all participate in a coordinated scheduling process. Launch schedules for the next 12 months are reviewed considering processing and buildup time, launch support, pad reconstitution, potential problems, and scheduling conflicts. Besides this review, we have established launch windows so that the launch operators can optimize conditions for success. The track record since implementation has been extraordinarily successful; and very importantly, our customers are satisfied.

We are also committed to improve cooperation in the commercial launch sector, and our support for commercial space activities is rapidly maturing. At Vandenberg AFB, we support eleven different commercial enterprises and have eleven more in the early stages of program introduction. Work on the California Commercial Spaceport is progressing, with initial operational capability planned soon. In addition, Spaceport Florida plans to have the commercial spaceport at Cape Canaveral operational this year.

In the other part of the Space Forces Support mission, we operate a worldwide network of satellite control facilities to control or "fly" our satellites once they are launched. This network checks out new spacecraft, readies them for operations, then operates the spacecraft for the duration of their useful life. We continue to commit significant resources to modernize this satellite control network. For example, we have implemented several upgrades which significantly increase information throughput, improving network efficiency. These improvements will transition our current spacecraft command and control system from a mainframe-based architecture to a PC-based, open architecture system. This transition will simplify data presentation to our operators and consolidate satellite platform and payload operations. The $81 million across the FYDP has been removed from this budget request in anticipation of the savings from the communications upgrades.

Force Enhancement

In the Force Enhancement (or space support to warfighters) areas the Command provides space-based navigation, weather, and warning of ballistic missile attack.

We also consolidate and focus warfighter requirements for space-based intelligence, surveillance, reconnaissance systems and space based communications capabilities.

Our satellite communications provide critical command and control connectivity not only to our warfighters everywhere in the world, but also to other U.S. Government users. Specifically, the Defense Satellite Communications System (DSCS) provides super high frequency secure voice and high data rate transmissions for worldwide military command and control, crisis management, relay of intelligence and early warning data, treaty monitoring, diplomatic and Presidential communications, and communications support for deployed tactical forces. DSCS also provides limited anti-jam worldwide connectivity for critical functions such as tactical warning and attack assessment, and emergency action message dissemination for the National Command Authorities, the Joint Staff, command centers and other users.

The Fleet Satellite Communications System and the UHF Follow-on (UFO) system provide UHF and EHF communications for mobile forces, including fleet broadcast services, command and control communications, emergency action message dissemination, force direction and force reporting.

The Milstar system provides extremely high frequency (EHF), survivable, low probability of detection, jam-resistant communications to tactical, mobile, and fixed users. Additionally, we'll be fielding an interim polar EHF capability.

We had five successful MILSATCOM satellite launches this past year—one DSCS satellite, one Milstar, and three UFO satellites. These launches give us healthy constellations, in all frequency areas (SHF, UHF, and EHF) world-wide. We also repositioned a DSCS satellite last year to improve the communications for our forces operating in the Balkans, and we moved another one over the Indian Ocean to improve our service to U.S. forces in the European, Indian Ocean and Western Pacific theaters. Last December, we completed the first crosslinking between the two Milstar satellites documented by a "ribbon-cutting" message by the Chairman of the Joint Chiefs of Staff. USSPACECOM is assisting with the initial phase of the Global Broadcast Service called the Joint Broadcast Service. This new high capacity technology allows us to send more information like television, photos, and data directly to forward deployed users. USSPACECOM will ensure that the concept of operations and the operations requirements meet theater and component needs for the system of the future.

Navigation service is provided by the Global Positioning System, the world's largest satellite constellation consisting of 24-satellites. It provides 24-hour, all-weather, day/night, three dimensional, precise navigation and timing data to land, sea, and air-based users around the world. These users include U.S. and allied military forces, as well as other national security, civil, and commercial users.

We provide weather support to theater forces with the Defense Meteorological Satellite Program. This polar orbiting system provides real-time weather data and other information directly to the theater warfighter. Direct weather support is growing even more important because of the proliferation of weapon systems using laser guidance and infrared imaging. For example, weather satellites are being relied upon to support the full range of JOINT ENDEAVOR operations. The President's decision to converge military and civil polar-orbiting operational environmental satellites will result in a merger of the follow-on programs for the Defense Meteorological Satellite Program and the National Oceanic and Atmospheric Administration Polar Orbiting Operational Environmental Satellite. This cooperation will result in a projected savings for DOD and DOC of several hundred million dollars over a 10-year life cycle.

To counter the threat of ballistic missile attack, USSPACECOM operates both ground and space-based systems as part of our warning mission. Our Defense Support Program satellites provide the space-based portion of the system. A network of ground radars provides a second means to detect attacks. Our ability to detect ballistic missile launches plays and important role in deterring attack.

In addition, we have invested considerable effort to improve our ballistic missile warning for theater commanders. These Commanders depend on our improved system, the Theater Event System, to provide theater ballistic missile attack data in their areas of responsibility. This recently operational theater system consists of elements from the Air Force, the Army, and Navy and provides considerable improvement over the system used in Desert Storm.

USSPACECOM is also the warfighter's voice in space-based reconnaissance requirements. Information products derived from space provide key intelligence support. Information from space-based reconnaissance is an increasingly important tool for theater commanders in preparing for and waging war. We are helping to develop requirements for a force structure which will ensure adequate collection, processing, exploitation, and most importantly, dissemination of real-time information to support warfighting requirements around the world. We do this by working with the intelligence, acquisition, and space communities, together with frequent discussions with the theater commanders. This process has contributed to increased emphasis on responsive tasking, an improved information distribution system, emphasis on survivability of key ground facilities, and increased attention to warfighter requirements including broad area surveillance and the precision location of targets.

Space Control

Our third mission, Space Control, is of growing importance because our increasing dependence on space resources. It includes space surveillance, denying an adversary's use space capabilities, and protecting our own space assets.

We have several ongoing initiatives to improve our surveillance of space. These include fielding of two electro-optical tracking systems and deployment of a new ground-based radar capability. These improvements to the Space Surveillance Network will improve our ability to track and image objects in deep space.

Because the use of space-based services is rapidly increasing, and the number of nations with access to militarily useful satellites is also growing, it is imperative we ensure our freedom to use space, as well as to deny its hostile use by an adversary. There are about 34 foreign nations or international consortia which have space capabilities for national or membership use.

We must also be concerned about a potential adversary's use of our systems or those of our allies for hostile purposes. We work within our Government, as well as with other governments, to find solutions to the problem of use of these systems by adversaries in the event of conflict. Negotiated agreements to deny an adversary's access to commercial systems, for example, will become increasingly important.

Because our dependence upon space, both military and civilian, is growing, we must consider the protection of our space assets. Protection techniques include such things as maneuvering, hardening, redundancy, and autonomy. Users of space systems must have confidence they will be there when needed. We are the world's leader in space, but our leadership in this field depends upon our ability to ensure our unhindered use of space and an ability to deny an adversary's use in conflict.

Force Application

USSPACECOM's fourth mission is space force application. Although still in the conceptual stage because no space-based weapons exist, this mission area considers future operations in direct support of other combatant commanders and the National Command Authorities.

The Unified Command Plan also establishes that USSPACECOM should plan for the possible operation of a National Missile Defense system, if the decision to deploy such a system is made by the Nation. In view of the increasing interest in this subject, we are doing considerable work in developing an operations concept.

PREPARING FOR THE 21ST CENTURY

While the readiness of our current space force structure is very high, we face a continuing need to modernize our force structure and to better integrate space capabilities into the operations of our military forces. These imperatives must be carried out during a period that demands we reduce the cost of operations in space. To successfully chart our course through this period, we are developing a mechanism for dealing with the trends that will lead us to the 21st Century.

National Space Policy

Progress brings with it new policy challenges. Space operations offer a means to enhance our global presence and interaction. Obtaining the maximum benefit to the Nation from the investment in space is an essential element of the forthcoming National Space Policy. The new national policy, an update to the one signed in 1989, will deal with rapidly changing space and strategic landscapes. We expect it to reconfirm the importance of military space operations to our national security.

Global Positioning System National Policy

We have also been in close coordination with development of national GPS policy. The President's commitment to provide GPS signals to the international civil aviation community and to other peaceful users of radio navigation and positioning systems is one we can support. At the same time, we are concerned about limiting the potential use of the GPS by adversaries, while protecting our own ability to use it. In this regard, and in consonance with our Unified Command Plan responsibilities, we have developed requirements for systems to address this issue and expect them to be validated this spring.

DOD Space Reorganization

Both DOD and Congress recognized that DOD needed a better organization to oversee space management issues. This last year has brought significant and positive changes to improve the situation. We participated in the decision process to make these changes, and are extremely pleased to now have an appropriate level of emphasis on coordinating and acquisition and development of our space systems. DOD recently added the Deputy Under Secretary of Defense for Space to oversee the space policy and acquisition process. The Space Architect has also been established to develop an integrated space architecture and to coordinate with appropriate counterparts in the Intelligence Community. The Joint Space Management Board is a forum for senior management in DOD and the Intelligence Community to address and coordinate defense and intelligence space policy, acquisition, architecture, funding, and related issues. USCINCSPACE is a member of this Board and, along with the Vice Chairman of the Joint Chief of Staff, will provide representation from the warfighters' perspective. We believe these are the right organizations to bring the coherence we need to our space programs. Integrating Space Forces into Military Operations

One of the most important initiatives and responsibilities of USSPACECOM is to integrate the use of space assets into the normal warfare planning process and operations. By doing so, we hope to normalize or "operationalize" space capabilities and the leverage they provide. We want to make support from our space forces understandable, usable, and accessible. We want the theater CINCs and their assigned forces to understand what space systems bring to the fight in the same way they understand what air, land, and sea forces provide. If we successfully do this, and we believe we have made excellent progress in this past year to that end, then it will enhance our overall warfighter effectiveness.

We are developing and fielding of a computer-based system which makes space support data available to the warfighter at the theater level. It's user friendly, can be deployed easily, and has been standardized with all our Components. This tool, called TSOC or Theater Support Operations Cell, will be a vital element in helping users understand both the capabilities and limitations of the space systems available to them. This, in turn, will lead to using space systems in a more routine way. Feedback from the field has been excellent.

Our Joint Space Support Teams and Service Component Space Support Teams are also a success story. We saw the need to take space support to the field. These Space Support Teams have helped integrate space at all levels through assistance in deliberate planning, training, exercising, crisis planning, and actual execution. The value-added to theater CINCs can be seen in the direct support we have given to all phases of military planning and operations. The Joint Space Support Teams are the arm of USSPACECOM that reaches out to theaters and brings a wealth of space expertise—again—understandable, usable, and accessible.

Space-Based Infrared System (SBIRS)

Our number one priority acquisition program—SBIRS—continues to make progress. This sensor will begin to replace the Defense Support Program Satellites just after the turn of the century. This system is essential to strategic users as a replacement to DSP and to theater users because of its ability to detect the emerging threat missiles. Last year, the Defense Resources Board endorsed a "High Now, Low Later" architecture and the SBIRS requirements were validated. More recently, on August 4, 1995, two contracts were awarded for 15-month design efforts. Requirements, funding, and acquisition activities have come together superbly—all are on track for getting the warfighter an improved ballistic missile warning capability on time in 2002. In the year ahead, we look forward to the refinement of requirements, and continued fast-paced acquisition. We have been actively engaged with the user and the developer communities in performing a cost versus performance trade analysis. The result will be a user-influenced balance between affordability and operational utility. In the fall, we expect to down-select to one contractor with the start of Engineering Manufacturing Development phase at the beginning of fiscal year 1997. We believe this program continues to deserve your strong support.

Missile Defense

Ballistic Missile Defense of North America and of our forces in world-wide theaters is something about which we must be concerned. As mentioned earlier, the theater missile threat continues to proliferate. We support efforts to develop and field theater systems to protect our forces and our Allies and friends from ballistic missile attacks. We will contribute to these efforts through the development of the Space-Based Infrared System—which will be a critical warning element.

Turning from the theater threat, we just received a new intelligence estimate on the ballistic missile threat to North America.

We believe DOD's three point strategy to counter the ballistic missile threat strikes the right balance between near term actions and longer term needs. We must consider in this balance technical achievability, affordability, and program executability. We must seek to prevent the threat from growing and reduce the numbers of missiles, deter our adversaries from using their missiles, and prepare ourselves to defend against ballistic missile attacks.

Satellite Communications

Satellite communications have evolved into the most versatile, global means to provide key information to the mobile warfighter. This year, satellite communications is in the top ten of every Unified Commander-in-Chief's priorities. The major challenge facing us is to meet the growing need for critical information when our current communications satellite constellations start to play out in the 2003–2006 timeframe.

Virtually every warfighting system we are building depends on information. We are relying on precision weapons, tightly linked sensors and shooters, current intelligence, situation awareness, and ultimately dominant battlespace awareness and knowledge, to win future conflicts. These information-intense systems depend upon high capacity connectivity to be effective. Modern, precise, lethal systems cannot be effectively employed without connectivity. Satellite communications provide that connectivity to commanders, soldiers, sailors, and airmen in the field who must be mobile to carry out tactical movements. Because we must operate anywhere on the globe in harsh and austere environments, space borne communications can provide the flexibility and mobility to meet these needs.

The smart use of new commercial satellite and terrestrial communication technologies offers quantum improvements in our ability to rapidly disseminate large amounts of information to the warriors on the move. For example, by leveraging commercial technology, we can quickly provide warfighters with a powerful information transfer capability through satellite broadcast. DOD has initiated a Global Broadcast Service program to send unprecedented quantities of information to the troops in the field through Very Small Aperture Terminals (VSAT) that add little to the weight and volume of the warfighters' load. The Joint Broadcast Service, an Advanced Concept Technology Demonstration in Bosnia mentioned earlier, is an example of how we are using that technology today.

Global Broadcast Service capability is just one of the areas we intend to exploit. We need bigger and better satellite "Pipelines" than our current systems can provide. We have started planning for our next generation satellites before our current systems begin to reach the end of their expected lifecycles. Programs such as the Defense Satellite Communications System Service Life Enhancement Program, the Milstar Medium Data Rate satellites, and the interim Global Broadcast System on our UHF Follow-on spacecraft, will deliver more capability out of our current assets as we plan and field new capabilities. We are correctly positioned to chart our course for satellite communications and field systems that will meet the needs of the warfighter well into the future.

Spacelift

We have stepped forward to solve the problems of spacelift which resulted from the tragic "Challenger" accident and the erosion of our ability to compete commercially with the rest of the world's spacelift. We are moving to make the Evolved Expendable Launch Vehicle (EELV) program a reality. As a Nation, we are investing $2 billion to significantly reduce the cost of launch. Our goal is for this new family of vehicles to cost us 25 to 50 percent less than current spacelift systems in lifecycle costs. The Air Force is the lead service and expects the major cost reduction will be through modularization and standardization which will effectively result in increased production at less cost per unit. Lower operating costs are expected due to reduced manpower and improved standardization in our space launch infrastructure. We are working with industry to develop a standard payload interface, launch platforms, and infrastructure for both the medium and heavy lift configurations of EELV. This system must launch responsively in accordance with long range, deliberative planning. Launch vehicle performance, reliability, and standardization are other basic requirements for EELV. Four different contractors are now using our EELV operational requirements as part of the 15-month low-cost concept validation phase. The Initial Operational Capability of EELV, starting in year 2001, will move toward much needed, improved expendable launch systems.

International Space Cooperation

In the post-Cold War era, economic, political, technological, and even military factors have taken on new significance in defining and cementing key international relationships. The environment for international space cooperation is likely to be characterized by reduced federal spending for space activities, a narrowing of the economic and technological difference between the U.S. and potential partners, greater recognition of and competition in commercial applications of space, and a greater probability of coalition military operations. As the quality and quantity of space systems grows, the need for cooperative links between national security, civil, commercial, and international space cooperation also grows. Our Allies have recognized the importance of space applications to increasing the effectiveness and efficiency of modern military forces. By taking advantage of this recognition and U.S. and allied space capabilities, we can contribute to strengthening current alliances and contributing toward stability and deterrence. Integrating allied capabilities into distributed space constellations could provide greater space force robustness while reducing costs to the U.S. Cooperation also offers the added benefit of enhancing allied interoperability needed for effective coalition military operations. In addition, cooperation forms the basis for expanding the relationships between Allies for greater control of data from each country's military, civil and commercial space systems during conflict. Finally, cooperation increases the combat effectiveness of the individual Allies thereby enhancing the deterrent potential of the alliance structure and their stability.

From the operational perspective, increased international space cooperation holds promise for improving support to theater and strategic forces. If we can cooperate with friends and Allies to enhance support, while fostering larger national security goals, we can enhance our contribution to military operations.

Since our ground-based facilities span the globe, we continue to work with our friends and Allies on space cooperation. Our long-standing relationships with Australia and with the United Kingdom are excellent examples of cooperative efforts to provide warning of ballistic missile attacks.

We are also engaged with DOD and Joint Staff supporting various efforts in international space cooperation. To provide deterrence and enhance stability in a very dynamic and changing world. We are preparing to provide warning data which can be shared with our friends and Allies. We expect implementation of shared warning with NATO and Japan this year. We are also involved in specific efforts with France and Canada this year. Additionally, we support the military-to-military contact program with nations of the Former Soviet Union. Last year, Air Force Space Command hosted a GLONASS delegation from Russia to visit our Global Positioning System units. We anticipate a counterpart visit to their country this year. We also visited Ukrainian satellite control facilities this year and hope to sponsor a reciprocal visit later this year. Furthermore, in support of USACOM, we expect to participate in a United States-Russian theater missile defense exercise this summer.

CLOSING

The men and women of USSPACECOM and our Components are the reason we provide high quality space operations to our nation. In turn, their contribution would not be possible without the best recruiting, the best training, and the best equipment in the world. We must maintain our emphasis on these three key elements of the force to maintain our preeminent position as the world's greatest nation. Along with this is our need to assure appropriate quality of life for our personnel. We ask a lot of our people, and they exceed our expectations. We must not break this trust.

Mr. Chairman and members of this subcommittee, thank you again for permitting me to convey our priorities and accomplishments to you. It is an honor to serve our Nation with such great men and women and I'm pleased to be here again.

Senator LOTT. Thank you, General.

I would like to ask a few questions, and then I will yield to Senator Bryan for some questions.

Mr. Davis, last year, all of the congressional defense committees strongly supported acceleration of the Space and Missile Tracking System. All four committees added $135 million to the budget request for this purpose. To date, however, the Department has released only $84 million of this plus-up as I understand it. The remaining $51 million is needed if we are to reestablish competition in this program, which I believe the Air Force supports.

Do you support the concept of reestablishing competition in the SMTS program, and do you believe that the remaining $51 million can be usefully spent to further this objective?

Mr. DAVIS. Sir, as you referred to it, the $51 million is on hold, intending to be a source of a rescission proposal, it is my understanding, to the Congress for issues outside space. At the time that the $51 million was essentially offered in the system, we were re-prioritizing how we would proceed with executing the fiscal year 1996 budget. The FDS program, which you are familiar with, which is the Flight Demonstration System that is the heart of the SMTS effort, was pretty much on track, on schedule. There appeared to be no technical difficulties at that point.

As we sit here today, I have some concerns that, should that money be restored to the program, I would like to open a dialogue with you to see how we apply the $51 million. There are really two issues here. One is the low-cost experiment and the competition to which you referred. I certainly agree there is value in increased competition at any level in this program. But the second issue is how much we would spend on competition, and perhaps at the expense of making sure that the fundamental FDS program is on track and on time, and gives us the information that we need should the Secretary of Defense and the Congress agree that we proceed down that road in 2003, to begin launching or have an IOC on these systems.

So that is a long answer to say that I do not have the money right now for good and valid reasons. We re-prioritized elsewhere. Yes, there is some value to a low-cost experiment. My reluctance to spend the whole $51 millon on the low-cost experiment is driven mainly, in my personal opinion, that we probably are better off in the long run if we take some of that and apply it against the basic FDS program itself.

Senator LOTT. All right, sir.

Mr. Hall, I understand that you are new on the job, and I also understand that you cannot get into detail on specific NRO programs in an open session, but can you provide your general views on the future promise that small satellites hold for a range of military and intelligence functions?

Mr. HALL. The NRO has taken a great interest in small and smaller satellites. Many of our systems, as you know, currently fly on the Titan-4 Heavy Lift Vehicle. That is an expensive launch vehicle, and if we can downsize, there are significant economies that can be achieved.

So, in some cases, getting off the Titan results in smaller satellites, but not the same class of small satellites that people have also been interested in, which are very small satellites.

We have hired, for example, the former director of the Clementine Program as our small satellite director. We have given him the task of taking NRO requirement sets and asking him to look at ways whereby small satellite architectures might be able to meet those requirements, and have given him free rein in his ability to explore that and to propose solutions to compete with the so-called larger satellites.

I am quite optimistic about the ability of the NRO in the future to downsize many of its satellite systems that currently fly on the Titan. Indeed, a number of our systems are already on that path, moving off the Titan onto Atlas. When you look at certain capabilities, such as imagery, which require large optics or other type of large structural features, and contemplate the real small-class satellite—5,000 pounds—there is some controversy within my own organization on whether or not that will lead to a successful, cost-effective architecture. It probably is achievable, but "At what cost?" becomes the question.

So, in summary, Mr. Chairman, I think that there is great promise and, indeed, great incentive to look at and pursue small satellite initiatives. Indeed, under the direction of the authorization intelligence committees, a small-sat panel is being formed to look at imagery satellite opportunities in particular. We hope to have the results of that within the next couple of months.

Senator LOTT. General Ashy, in your view, should DOD seek to place greater emphasis on these small satellites for a range of defense missions?

General ASHY. Yes, sir, Mr. Chairman, I agree with Mr. Hall. We certainly ought to look at it, as he stated. When you look at the operational capabilities that you need based on the requirement, and then you look at the technologies and the physics that lead to performing that mission, that drives a lot of what we are talking about here in terms of size and weight.

As technology proceeds, I think we have some opportunities here that he and his committee are going to certainly look at in the study, and I would certainly support that.

When we can do this with better efficiency and better capabilities with smaller machines, if you will, then there is some good news in that, because the weight goes down and it saves us a lot of costs or could save us a lot of cost in lift. As you know, we are working on the Evolved Expendable Launch Vehicle, and the purpose of that program is to permit us not only assured access to space, but cheaper costs into space. This will contribute to that.

Senator LOTT. Well, General, this subcommittee has supported the development and demonstration of miniaturized space technologies, the so-called microsat program run by Phillips Lab and the Air Force Space Warfare Center. What is your assessment of that program? Do you support it? Do you recommend we continue to support it?

General ASHY. Yes, sir. In consonance with what Mr. Hall said and what I just said, I think we ought to proceed to certainly look at the opportunities that we can leverage off today's technology as it proceeds and do things better and faster and cheaper and smoother.

Senator LOTT. Mr. Davis, Mr. Hall mentioned the Clementine Program. I am informed that the Department has withheld most of the funds added by Congress in fiscal year 1996 for a follow-on to the very successful Clementine Space Technology Experiment, the so-called microsat program. This was an initiative from this subcommittee that was supported by all the other congressional defense committees. Can you provide us some assurance that you will take a good, hard look at this program?

Mr. DAVIS. Yes, sir. Moreso, I share the views of General Ashy and Mr. Hall on this. Just a brief statement. It is potentially on the same magic recission list that I referred to for SMTS. We are prepared to execute the money should it be restored to us. But also I think the Department, and part of I think why you see the four of us here today, is to change the way we are doing business. I personally find it unacceptable that we cannot come with a plan to the Congress and say how we would use small sats and how we would use microsat technology.

I appreciate your initiative in prodding us year after year after year, but, frankly, next year when we are here, we should have a plan to lay out in front of you and say here are the technologies we wish to pursue, here are the missions they should be able to perform. If there are militarily relevant missions that we can support General Ashy with by using microsat technology, we should go do experiments and do that.

At the moment, we have no such plan, and it is my intent that we have working groups that will be meeting to address these issues.

Senator LOTT. General Dickman, one of your major initiatives is the satellite communications architecture. In your statement, you mention that this will be complete by July of 1996. If I am informed correctly, this was supposed to be finished last year. What is the delay, and why are you confident we will be able to make this new deadline?

General DICKMAN. Well, there was a major MILSATCOM architecture that was reported out last fall. It focused largely on replenishment of the systems we have today, varying technical approaches, but essentially the same tasks.

Mr. Davis and Dr. Kaminski and the leadership of the Department, in viewing the outcome of that study, concluded, I believe, that there were more fundamental decisions that need to be considered: should we be focusing on protection or capacity, should we be using mixed orbits rather than the way we have been doing business in the past, larger satellites or smaller satellites, use of UAV's to complement a satellite architecture, commercial sharing, commercial integration, perhaps a relay-based architecture.

So they asked us, as our first architectural task, to look at a much broader scope of satellite communications options. What we are doing is everything that we are looking at, we have confirmed with industry is within the realm of the technologically possible in 2005-2010. We are not quite so constrained as the work that was done last year, in terms of first flight.

I am confident we can meet our schedule to report out in part because we set that schedule as one that we have to adhere to. I spent some time at the Cape, and General Ashy often reminded me when I was there that the schedule was important, and if you worked towards meeting it, you will. I have no doubt that we will.

Senator LOTT. Senator Bryan.

Senator BRYAN. Thank you very much.

Mr. Chairman, let me change the focus a little bit. Mr. Davis, I recently had occasion to be in Panama to visit with SOUTHCOM and to talk a bit about drug interdiction efforts, which have been of concern to this committee and our distinguished chairman, as well as the intelligence committee in which I serve.

Can you describe for me—and I realize we are in an open session—what capabilities do the space-based system bring in helping us interdict these massive transshipments of drugs that come from the Andean countries into the United States, in which, notwithstanding the best efforts of the Republican and Democratic administrations alike, essentially the street price of these contraband products seems to remain at a constant level, which suggests to us that although we are able to confiscate more each year, seemingly the production capability has expanded as well?

I guess, with all the technology, a lot of people are constantly asking what is the role of the military in assisting this national problem that I think all of us recognize that we have, and specifically this extraordinary capability that you, as distinguished members of this panel this morning, shared with me and from what I have gathered previously with visits I have had with Mr. Hall and others on the NRO capabilities.

Mr. DAVIS. Yes, sir. Let me give you two different answers, and then also ask Keith, in terms of support, to discuss whatever he can say at this open hearing and then, General Ashy, also, if he would not mind responding, too, because, frankly, if any airplane flies into the United States, he is supposed to know about it.

So, two answers at the beginning. In terms of direct support, we have imagery and signals intelligence. To the extent that those can be used, they are being used. Second, my sense is that the real function of space here is more of indirect support, in that communications links, real-time support to aircraft and ships on patrol out there, that is critically important.

Tipoffs, if we have information, for example, that an aircraft may be departing from a strange area someplace in South America and the path is known to be a certain direction, you have to get that information to the right place at the right time so that perhaps an aircraft can intercept it. Also, the space assets all have to work together intimately to do that.

My instinct is, though, that the supporting function is the primary one, in terms of space. A lot of this work is primarily done by ground-based radars. It is critically important to have eyeballs on the scene. We have to have aircraft out there. A lot of the support is done in those areas.

So I think you are touching on a very complicated area, and it is something that we are all working to improve. In some cases, space is not the solution. I understand "space" is what is in my title, but that is not necessarily always where we need to put the money to address some of these problems, sir.

Let me ask Keith if he wants to add anything in terms of intelligence support.

Mr. HALL. I would agree with everything that Bob indicated. I think it would be worthwhile to provide you a fully classified answer for the record, which I will endeavor to do.

[The information follows:]

[Deleted.]

The only supplement that I would make to what Bob said is that one of the hindrances that we face in that region of the world, generally, that inhibits our imagery capabilities is weather. I know, for example, just in being able to provide support in mapping to SOUTHCOM, we have had great difficulty in acquiring the total amount of imagery necessary to build good maps in the remote areas where many of the drug production and processing activities take place. That very same problem also makes it difficult to utilize these same systems to provide tactical support in the interdiction effort.

Beyond that, I think it would be best explored in classified areas, Senator.

Senator BRYAN. Mr. Hall, if I can before General Ashy responds, if you can respond in open session. Do we have the capability to track aircraft that either originate or land at these sites in these clandestine locations that are not regularly commercial airports around the world which may have a great bit of legitimate traffic flying in and out? Are you able to respond to that in open session? If not, I would be happy to have you share it with me privately.

Mr. HALL. I would prefer to provide a private answer to that.

[The information follows:]

[Deleted.]

Senator BRYAN. All right.

Mr. DAVIS. Senator, if I may make one comment on that. I spent, in a previous job, some time wandering around that area of the world, talking to U.S. and foreign personnel. When you look at the geography that is physically down there and some of the airstrips that these aircraft come from, it is difficult under favorable conditions sometimes to simply figure out what is going on when you are sitting on top of the hill or around on the other side. It is a difficult problem regardless of what the source is, whether it is space, whether it is ground or whether you are in an aircraft trying to pick something up.

Senator BRYAN. I do not minimize the difficulty. My question is not to be critical, but I think it is a sense of frustration that a lot of us have. We have such an enormous technical capability, to the credit of all of you who appear before us this morning. This problem seems to—and quite candidly, this is my own assessment—I do not think we have made great impact.

Obviously, one can be very critical that there is a demand for that product, and it originates here and the fault lies with us. But in terms of interdicting this rather sophisticated network and the amount of drugs that come into this country from that region of the world, it is 100 percent of the cocaine. I wish we could do more. We can talk more about that, as Mr. Hall suggests.

General Ashy, I did not mean to interrupt before you had a chance to respond.

General ASHY. I think your question, Senator Bryan, talks about the interdiction. But with regard to one capability that we can help from with my Space Command hat on, it is something called multispectral imagery, where you can take a picture and you can, in layman's terms, you smash it together digitally with the map of the Earth, and you can manipulate this data to help a warfighter.

In the space support teams that I have described to you, we perform that helpful service to all of the theaters, certainly to include SOUTHCOM. We do it through our joint team, but we can do it through our components. As you know, we have an Army Space Command, a Naval Space Command, and certainly Air Force Space Command.

So that is one capability that we can use and be helpful with in terms of predicting and knowing where stuff is originating possibly.

Let me take that hat off now and put the NORAD hat on that I also wear that Mr. Davis was, I think, referring to. We are in a supporting stance in NORAD to help the Drug Enforcement Agency and ACOM and SOUTHCOM in their efforts to do the mission to which you refer. Without getting into a lot of detail and keeping this brief, we lash up with them in our command and control systems.

One good example is the Counterdrug Joint Interagency Task Force at Key West. We share intelligence with them. We also share a surveillance information with them from a variety of radars such as the Joint Surveillance System, ground-based sensing radars jointly funded by the FAA and the Air Force, and the aerostat radars Air Combat Command and 1st Air Force provide us along the southern region of the continental United States.

So those are contributing capabilities that we do in a supporting way.

In terms of your last question, what you are talking about is wide-area surveillance. How do you perform that capability? So when you are talking about a sensor like radar, do you employ it from ground-based systems, air-basing of some sort or space-based? I just want you to know, as CINCNORAD, that is an important combat capability that we have to worry about. It is very high on our integrated priority list. There are technologies being developed to contribute to this capability.

So I just wanted you to know we do think about it quite a bit and we have it on our requirements list. It is very important that we figure out how to do this best. In our long-range planning, we look at space-borne capabilities. I think it is a little bit too early, in terms of technology right now. Therefore, that is why we rely, as Mr. Davis alluded to, primarily on our land-based and air-based systems.

Senator BRYAN. Thank you very much.

Mr. Chairman, with your indulgence, if I might ask one or two other brief questions.

Senator LOTT. Sure.

Senator BRYAN. Mr. Hall and I have had occasion to have some constructive conversation with respect to the financial management of the problems that NRO has had with respect to the carry-forward accounts, which is not his fault, but they have ballooned into an extraordinary problem for us. So I guess my question, Mr. Davis, is to you.

NRO is a part of the Department of Defense. I have kind of characterized it as having a rather hybrid relationship, because it is not altogether clear, because it provides service for many different customers. Also I must say, historically, I think the track record is exceedingly poor in terms of financial management, both for the Department of Defense, OMB and within NRO itself.

In your responsibility, do you have any responsibility for the financial management, that is to say, any oversight function to ascertain whether indeed the agency is performing its financial functions? If not, where is that vested in the Air Force?

Mr. DAVIS. Sir, my office is involved in program oversight in accordance with, as I mentioned in my opening statement, the Joint Space Management Board. It is not directive oversight. It is shared oversight.

Senator BRYAN. Mr. Davis, let me just interrupt. That is part of the problem. I do not mean to be rude, but I mean shared oversight is, in effect, well, it is the other fellow, it is them, it is not me. Help me a little bit to get a better understanding, because we may very well want to do some restructuring here, without in any way reducing the technical capability that has been achieved. But, I must say, we are talking about billions and billions of dollars.

Mr. DAVIS. Yes, sir.

Senator BRYAN. So we are not talking about inconsequential sums. I think the NRO performs a vital function. I fully acknowledge and compliment on its technical capabilities.

Mr. DAVIS. Yes, sir.

Senator BRYAN. But we have got to get a handle on this.

Mr. DAVIS. Absolutely, sir. I agree with that. I know Keith does as well. But I was starting to draw the distinction between program oversight and financial oversight. It really is a distinction.

Senator BRYAN. Sure.

Mr. DAVIS. Keith has more auditors probably looking at the NRO right now than he has people doing real work. I think we all understand why we are at that point. But in terms of my responsibilities, it is program oversight: Are the programs meeting Department of Defense requirements? Where are they heading in the outyears? Is there a better technical solution to it? Could it be done with aircraft instead of space-based assets? Things of that nature. It is a critically important function that really has not been done well between the Department of Defense and the NRO.

Specifically, to your question of financial oversight, in I guess it was November—I am trying to remember the date, but November—perhaps it was late October—the Secretary of Defense and the DCI jointly agreed that the Office of the Secretary of Defense Comptroller, John Hamre, has financial oversight responsibilities over the NRO, in terms of the ability to audit, to count dollars, to work with Keith's people. So that is the distinction I was trying to draw. I was not trying to avoid answering, but it is shared oversight, in terms of the programs.

Senator BRYAN. I understand that distinction and I acknowledge that it is a valid distinction.

Mr. DAVIS. However, there is a new agreement between the DCI and the Secretary of Defense. It places a burden directly on the Comptroller of the Department of Defense to monitor these funds. They are in the Secretary's budget. As the letters come to the executive branch from the Hill, whichever committee it may be, there is a consistent pattern that they come to both the Secretary of Defense and the DCI. If they are going to come to the Secretary of

Defense, then we need to be prepared to support him in responding to you all, as well as the DCI.

Senator BRYAN. Well, I mention this only because I think although you have program and not financial management responsibility, the accountability is very important.

Mr. DAVIS. Yes, sir.

Senator BRYAN. Obviously, when we have had the kind of problems that we faced—and these are endemic, this is not just this year. I mean if you go back to the late-eighties, and several times during the nineties, we have had these problems. We have got to get a handle on them. Moreso, we need to do the responsible thing without in any way incapacitating the agency to perform its primary mission, which it performs very well.

On the other hand, I must say there are a number of us who have been very, very discouraged by what we have seen, in terms of called to the attention in 1989, again in 1992, and the problem continues and, to some extent, it seems to have gotten worse. I know Mr. Hall is new on the job and those comments are not directed at him. However, I just wanted to sound the alarm.

Mr. DAVIS. Sir, if I might add one final comment. You are exactly right. We believe that a big part of the solution to the problems we are all familiar with, whether it is the NRO or Department of Defense space programs, is sitting right here in front of you today. Keith has been there 3 weeks.

Mr. HALL. Three weeks.

Mr. DAVIS. Bob Dickman has been there 6 months now, I guess, Bob. I have been there 7 months. As the chairman said in his opening statement, my office literally is only a year old. We are still in the mode of making promises, frankly. A year from now, if we are sitting here and you ask the same questions, if we cannot give you answers that here was what the problem was, here is what we have done to fix it, here is where the savings are, here is where we are heading in the future, then they do not need us. We are now part of the problem if that happens.

So we will have to have some patience on your part for a little bit. The criticisms are exactly right, sir. We are focused on that.

Senator BRYAN. We look forward to working with you, Mr. Davis. I thank you.

Thank you, Mr. Chairman.

Senator LOTT. Thank you, Senator.

General Ashy, would you describe the warfighting requirements for our next generation of communications satellites, and to what extent can we place greater emphasis on commercial systems and still satisfy our military-unique requirements? We have mentioned this with a glancing blow a couple of times, but I would like for you to talk a little bit about that.

General ASHY. Yes, sir. We have been heavily involved in describing this follow-on system, as we have talked about a little bit earlier. I would like to say right up front that I certainly agree with your charge in your opening discussion about leveraging commercial systems. We need to do that to the maximum extent possible. In looking at this follow-on system, we need to consider the needs of the warfighter, but we need to also consider how we can do it.

Let me just give you an insight as to what the warfighter wants. They want to have access. That is loud and clear. I am making a long story short here, but they want a lot of access and they want a lot of capacity. I will give you an example of how we can do this here in a minute and how we are doing it. I think Mr. Davis will want to talk about it perhaps a little bit. So that is what the warfighter wants.

Then you have to look at what the commercial sector can bring, which responds to your interest here. We have found—I cannot give you a precise percentage, but in a majority sense, we can leverage commercial systems. We can make them secure and redundant so that they can serve the needs of military operators.

What we have also found out, though, is that there are certain parts of the globe for which commercial sector has no market. So we are going to have to go in there and have some military capabilities that are unique just to the military to serve these needs. Our Naval forces, for example, that operate in some interesting places around the globe need that capability. That is just an example.

There are also certain capabilities that are important to General Habiger, for example, and myself in my NORAD hat that require some hardened and assured communications. So we are going to have to take a look at those requirements. What that minority fraction is, I do not know yet, sir. General Dickman is going to have to sort that out once we get the operational requirements document done.

I will report to you, sir, though, that we are about finished. We will take it this spring to the Joint Requirements Oversight Council, which is a good-news story. It is reviewed in this new process that we are talking about so that Mr. Davis can take the policy and issue it to Bob Dickman so we can have an architecture leading to the capability.

Let me just give you an example now of something that has come out of this thing. It is another acronym, but it is called Global Broadcast Service. It is like a television service that responds to the warfighter, in terms of this access and capacity and what we call bandwidth. It is the size of the pipe that delivers the product. The bigger that pipe, the better off we are.

Let me just give you an example of where we were and where we are going with this new system. If you wanted to get a picture to a strike pilot on a carrier, and using the UHF satellite capability we have, it would take most of the night and half the day to get one picture to the user. That is what we do not want. We need to improve the service. If we used the big, wide-band system that I have described in my little demonstration, it would take maybe 10 or 15 minutes, but you would not put anything else through the pipe since there is a lot going through that pipe.

With this new system that we are about to test in the Balkans, in Bosnia, leading to an element that Bob will use in his architecture, you can not only get a picture every 6 seconds to multiple users, but you can also get television. You can get motion and you can get the text. So this is what the warfighter wants and this is what we are going to deliver. Also it is leveraging the commercial systems and the capabilities.

Let me just add that the warfighter can, in the concept of ops, choose, say, 10 or 15 channels to this component and this component, and this component and then have some overlapping channels. You may want to see the image from a UAV taking pictures. This is sort of an example that we could deliver in real-time. I think we all support it. We are heavily involved. I think, in answer to your question, we can leverage, too. We want to leverage to the maximum extent the commercial capability. This makes us more effective in the battle space.

Senator LOTT. It is really incredible. This is even better than Jeb Stuart.

Do you want to comment on the subject, Mr. Davis?

Mr. DAVIS. Just briefly, sir. Use of commercial technology services is important to us across the board. It is very important. In communications, it is clearly an important area. The Department of Defense, 20 years ago, if we had money and the requirement, we could go to industry and say, Please, we would like for you to do the following things, and they would be delighted to do it. Today, we are a very small piece of communications service in the world in requirement, first of all. Then, second, it is out there. We can do it cheaper. We can do it faster. We can do it better. We can get better support to the warfighter.

Global Broadcast Service, as General Ashy is talking about, the way I would describe it is you could pick a place on the face of the Earth, and with some of the competing proposals that the vendors have out there, if you focus all the capability of one satellite in one place, every 5, 10, 15 seconds you could dump the equivalent of the Encyclopedia Britannica on that one spot, whether it is video, imagery, data. That is a tremendous amount of information that we cannot move around the world right now.

Commercial initiatives are important across the board. Launch is important to you all. Frankly, as part of our EELV program, we are seeing how we can become less manpower-intensive, and can we buy launch services instead of owning hardware. It is an important initiative across the board, not just in communications.

General ASHY. Sir, could I add one thing?

Senator LOTT. Sure.

General ASHY. In the JROC process, Admiral Owens and the Vice Chiefs, and now General Ralston, who will carry on this, recognized the need for us to dominate the information in the battle space. Therefore they have defined a couple of objectives—to know what the other side is doing. This is really key to that effort; to win decisively.

Second, you asked me a question about what is important to the warfighter. Besides the elements that I described to you, they need something that is not tethered onto a fiberoptic cable. I mean we fight in mobility. So we need something that can get to a ship or a track vehicle or an airplane and such. This delivers that capability. Also I just wanted to add that it is a very good capability.

Senator LOTT. General Ashy, the EELV, a key element of space support and space control, is assured access to space and the ability to replenish space assets in a timely manner. Unfortunately, the EELV space launch program is unlikely to provide much additional launch flexibility and responsiveness. In your view, what could be done to improve our capabilities in this area, and do you believe that reusable launch vehicles are part of the answer?

General ASHY. Yes, sir. Well, I think it is going to provide us increased flexibility. We have a space policy that delegates the expendable vehicles to DOD as the lead agency. In my Air Force hat, that is delegated to me. We work that very hard. In the last year, we have worked the scheduling process very hard. General Horner, my predecessor, criticized that process, and I paid attention to that. We get together with the user; the producer; the shooter, which is me and my launch wing commanders; and the Department, this includes NASA; and our commercial and civil users that also use those space ports out there on the East and West Coast.

The problem, Senator Lott, is it is too expensive. So, that is what EELV is going to help us correct. There are five elements to the requirements. You have got to get it up there safely; you have got to get the payloads up there, in terms of the throwweight requirements; we need to be responsive; and we need to be timely. I just talked about the timeliness of that. This program, though, the most important factor is the cheaper cost. We think we are going to—and we have got this written into the requirement document—we think we can save between 25 and 50 percent over the long run in our launch costs. So with regard to the flexibility issue of your question, I think this will give us additional flexibility to meet those responsive needs.

So that is a summary. The program is on track. I think General Dickman could talk about this a little bit more in detail, but this is going to give us added flexibility we direly need, and it is going to be a cheaper cost.

Senator LOTT. Actually, we have kind of eased over into an area that Congress is going to be reviewing very soon, and that is the auctioning of part of the broadcast spectrum. Because of this, I am concerned about some of the recommendations that have been made in this area, and I am very interested in what Congress might do. We are looking at it from a budget standpoint, a policy standpoint in the Commerce Committee, but it also has a military aspect to it of real significance.

I must say in the past we have not been able to get the information we really needed from DOD for some obvious reasons, but I assume DOD is reviewing this issue, and I want to make sure that we do not endanger future military needs in the spectrum broadcast area. On the other hand, the Pentagon cannot just say we want it all, everything we have got. We want you to have everything you need, but not a bit more, not a kilohertz or megahertz or whatever more than you need.

I do not know if this is really your area, but I would like you to comment on that.

Mr. DAVIS. Mr. Chairman, we are involved, but we are not the lead on it. The Assistant Secretary of Defense for C^3I is the lead, but we are involved in it. Dr. Kaminski has represented the Department of Defense along with the administrator of NASA and the FCC chairman on a working group that is working with industry because they are concerned. U.S. industry is concerned in terms of those that support defense frequencies, and you are exactly right: People such as yourself, and thank you for your continued support in this area, we do not arm you well with facts when you go to debate this issue, and we know that.

The problem comes when you get into some of these areas like the famous situation of Air Force One flying into California with President Reagan opening garage doors which was off and on in the press. The way frequencies get allocated in some cases is that it belongs to a particular Federal agency, or whoever, and in this case Department of Defense on a particular frequency, but it may be used on a not-to-interfere basis by someone else. In this case, it was clearly the garage door manufacturers, as you use your remote control coming and going from home.

The problem is when the Department of Defense uses a frequency, then, in that situation where it has been dedicated to the Department of Defense but to accommodate other users, when they use it within the jurisdiction that had been allocated to them, we then are interfering with garage door openers. So we need somehow to get things like this cleared up, get a little clearer about shared frequencies. There are frequency areas that, as General Dickman is looking into future architecture, we may need to have reserved because we need to move into different frequencies in the future. We need to get you better information. I am not the right person to answer that question.

Senator LOTT. You are going to have to do that or we will wind up doing something that is not a well-informed decision, and we need your help in that area.

Mr. DAVIS. I will take that back.

[The following information was received for the record:]

DOD MANAGEMENT AND USE OF THE ELECTROMAGNETIC SPECTRUM

As Secretary Perry stated in his November 4, letter to Senators Lott, McCain and Hutchinson and Congressman Livingston, protection of United States interests, both at home and abroad, depends upon the capabilities of our military forces which are directly enabled by access to the electromagnetic spectrum access. Before any further government spectrum is reallocated, target bands must be carefully reviewed and consideration of the impacts on cost, military operations and, ultimately, national security must be a priority.

The Department of Defense (DOD) appreciates the spectrum needs of emerging telecommunications technologies and the positive impact these emerging technologies could have on the worldwide marketplace. The DOD is continuing to review its spectrum requirements to assess what additional spectrum can be shared and to identify ways in which we can more effectively and efficiently manage this limited resource. However, because of the vastness of military communications, radar and other spectrum dependent systems used worldwide, quantifying our cost and operational impacts is an extremely time consuming task. We are extremely concerned that while we are assessing the thousands of emitters used worldwide by the Department, the spectrum on which we depend will vanish. The process needs to be slowed down to ensure that the needs of industry are met without impacting national security. Additionally, the need to review spectrum usage, clearly articulate requirements, and identify opportunities for sharing does not fall upon the DOD and other Federal users alone, but on the commercial sector as well. A process must be established to address private sector requirements in a logical, systematic manner without jeopardizing military readiness and national security.

We are very concerned over the persistent erosion of government spectrum and the adoption of an implicit policy that concentrates on government spectrum as the default source to satisfy new private sector needs. The DOD can no longer be the principal source of spectrum for meeting the growing needs of the private sector without endangering future military needs. Instead of giving away or selling government spectrum, the needs of government and industry should be met through further sharing. This will require, however, the cooperation of both government and industry, to work together to develop the technical solutions necessary to permit commercial and government systems to operate harmoniously and without interference.

Senator LOTT. General Dickman, in your prepared statement you mentioned the work of the space architect as providing a cornerstone for the Department's space master plan. Can you provide a little more detailed description of what this master plan will entail? What will your role be, and what is the Department's time frame? I know that is a broad question, but I want to get this on the record, if I could.

General DICKMAN. Well, it is a broad question, sir, and it is one that I am going to defer in large part to Mr. Davis. As he has reported, there is no comprehensive vision. Our role in the master plan is both a leader and a follower. In some respects the architectures will provide cornerstones for elements of master plan; in other senses, the master plan will provide us a vector in which to proceed.

Our task is to support Mr. Davis' office in building that master plan, so if I can turn to him for the schedule.

Mr. DAVIS. Mr. Chairman, the Department of Defense, if we keep on track the way it looks like we will, in the next 10 years we will spend $125 to $150 billion on space and related activities. At the moment we have no strategic business plan as to where we are going to head in the next 15 or 20 years. You will see things like the Air Force's new VISTA study which is a very good statement of where we could go, but that, in fact, is not necessarily an approved Secretary of Defense plan.

I have developed a task group of the best and the brightest action officers that are working on this issue. We had a symposium with NSIA co-sponsoring it about 3 weeks ago. We had General Ashy and General Dickman, and I guess Keith was not in his current job at that point. We had CEO's sitting on panels, and we asked them blunt questions as to where we should be heading in the future in terms of our overall goals.

This panel I have put together is headed up by an Army lieutenant colonel, and I did say Army, because this really is to support the user out there. This Army lieutenant colonel is a career acquisition official. He is an astronaut, he has been in space. I talked to Dan Goldin at NASA, he sent me his executive assistant to work on this. I talked to Tom Moorman, the Vice Chief of Staff of the Air Force and said sir, I want the person who is going to be Tom Moorman in 20 years, your smartest major. He sent me one. Keith sent me one of his smartest folks. We are working with the Navy to get someone.

We are going to take this team of creative individuals and we are unleashing them to go out and sort through these. Our goal is by the end of this year the Secretary of Defense will be able to present to the Congress and to the world a business plan for where we think we should be 15 or 20 years down the road that is approved. Not just apple pie and motherhood statements, these will be management goals, that if General Ashy needs to make a decision he can say here is the approved plan.

At the moment in some ways we know where we want to go. It is like getting to an intersection with a bunch of traffic lights. We should not have to stop often and say do we go straight, do we turn right, or do we turn left? If we know where we are supposed to be 15 years down the road the decisions should come easier. We have some agreement with the Congress and in the building.

Once that is done, then we can get into some more of the details of the master plans in the terms that you were asking General Dickman.

General ASHY. Sir, could I just add one contribution to what I think that we are doing in our organization from the operational perspective to help with this? This is our long range planning process. We needed to start this, and so we have institutionalized a process now in the unified command that our components who operate with the services that give us the organized training and equipment capabilities that we use.

Together we are looking out there 25 years, and then looking backward based on what we think we are going to need, so we can influence what is about to happen to us. Also, I think Mr. Davis, Bob, and Mr. Hall can use this as a helpful tool. It is a process that provides us discipline to make sure that we have obtained the requirements that lead to these capabilities properly suspensed so that we do not find ourselves backing into a requirement.

So we have institutionalized this in the past year, and that is just a short report on where we are on that.

Mr. HALL. If I may say something, maybe, as you know, a significant part of the space budget of DOD that you see incorporates NRO funding, and the exact amounts of NRO funding are classified, of course, but for that significant portion there is an integrated roadmap that the NRO has for covering all of its systems. The issue that we are working in the Joint Space Management Board and with the DOD Space Architect is the extent to which that architectural roadmap needs to be adjusted to provide a cost-effective approach across all DOD space activities. However, I do not want to leave you the impression that there is the absence of a strategic plan and a roadmap in great detail across the NRO systems. That does exist.

Mr. DAVIS. I do not want to leave that impression, either, but when I am talking about goals, I am talking about goals in a different sense. You mentioned reusable launch vehicles a minute ago. I know it is very important to the Congress. My opinion is it is not whether reusable launch vehicles will be out there, it is when. Is it 15 years? Is it 30 years?

As a part of this goals process, we, in the Department of Defense and the intelligence community, need to get some sense of when NASA will finish it, when it will be operationally available, and then, if we pick a date, say it is 2015, 2010, if our goal then is to be able to use that, as it should be, we would turn to General Ashy and say, "Do you realize that what we might have is the capability of the traditional launch on demand that people keep bringing up? How would you do things differently if you could within 48 hours place a sensor in a certain orbit?"

You may not have to put things up there and leave them there. Fundamental changes in the way we have to think about things where we allocate our resources, there may be doctrine changes that he has to think through.

Senator LOTT. It is encouraging that you are looking at these things and thinking about that. Certainly, we need that, and we had not been doing it.

General, one of your primary responsibilities as CINCSPACE is to provide space support to the war-fighting CINC's. Is your unified command properly organized to fulfill this mission at this time?

General ASHY. Yes, sir. This has been an issue that has been often discussed. It was something you all asked me about last year, and I had reported when I came on the job as CINCSPACE to the Roles and Missions Commission, so I think we got it right. Now let me just tell you that, first of all, up front, I think the CINC's and services think we have it right, and I will briefly walk you through why I think we do.

Space is an operational medium, along with air, land, and sea. Although we have not said that space is our area of responsibility, we talk about it as our area of operations. Also the other CINCdoms, above their areas of operation of air, land, and sea, have areas of interest above them that we support them from. So it is like two CINC's being side by side, one maybe supported and one supporting. We are a unified command that supports through and from space into space.

Now, when we looked at the alternatives to answer this question, we went to the law, Goldwater-Nichols, and it basically says that the CINC's can organize as components—air, land, and sea—or they can organize with service components. Most of them look at it in a component sort of way, a functional componency, but when we asked ourselves the question, well what about this, there is no air, land, and sea in space, so we said okay, the second alternative is service components. Then we said how are we organized? Sure enough, we have an Army Space Command, a Naval Space Command, and an Air Force Space Command.

It was argued in some circles that air and space were the same, it was the aerospace, and perhaps the Air Force ought to be in charge. I am not answering or responding to this as an Air Force officer. I am responding to this as a unified commander, and that is not true. They are not the same. They are two different media, and so that leads to the proposition you may have a specified command.

There are objections to that because what the Army and the Navy really want is access to the requirements business that we have been talking about. Although the Air Force, I believe rightly contributes the majority of TOA and people to this effort, this unified effort, that is acceptable to our Army and Naval service components because they still retain access to the requirements process. They can still get the services, as I have tried to describe here this morning.

So to make a long story short, I think everybody is satisfied that we are organized correctly and we have service components. It ensures access to the requirements and the capability to get the services.

Senator LOTT. What is SPACECOM doing to ensure that the theater CINC's fully integrate space support in their planning and operations?

General ASHY. Well, I tried to describe this in our little demonstration, sir. We have tried to organize ourselves in terms of the requirements process. I am given the charge by the Vice Chairman of the Joint Chiefs to represent them, and we do that in our requirements business that we submit to the Secretary and the Chairman each year.

I also mentioned this long-range planning process. My Chief of Plans in the unified command, General Cosumono, goes and briefs every one of them before we submit those requirements. So I think we represent them properly. We also exercise with them, we also plan with them, we write one of the annexes in their war plans, in their deliberate planning process with regard to space capabilities, we do that with them, and the feedback we are getting based on this better understanding and access to the capabilities that we deliver is very good from them. So I think we are doing this a lot better.

Senator LOTT. I do need to join Senator Exon at the Budget Committee. I want to thank all of you for being here this morning. I will have some questions for the record that we would like to make sure that we get a response in the record.

I feel better than I did a year ago about where we are, and I hope that you will continue to make progress. We will have some concerns during the year, and we are going to probably have some more money for you than the budget will receive from the administration. Therefore we will seek your input as to where that should best go.

Thank you very much. The hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTION SUBMITTED BY SENATOR TRENT LOTT

VULNERABILITLES TO NUCLEAR EFFECTS

Senator LOTT. Gentlemen, as you move increasingly in the direction of reliance on commercial products and systems, you will generally sacrifice both jam-resistance and survivability. In addition, as I understand it, we have largely given up protection against nuclear effects in new space systems. It seems to me that this may be introducing new vulnerabilities into a very complex architecture; in some future conflict, we may find an enemy prepared to detonate a nuclear weapon in space, since the degradation it imposes on our capabilities may be far more serious than on the enemy's more limited assets. To what extent have we abandoned nuclear hardening in future programs, and what are the likely consequences if a nuclear weapon were detonated?

Mr. DAVIS. It is not completely clear that as we move to more commercial products and systems we would necessarily sacrifice both jam-resistance and survivability. Commercial satellites that are planned to operate for long life, particularly those in the geosynchronous belt, provide a total dose tolerance similar to that required for military systems. However, as you state, the more stressing scenario is for the single event. In that regard we are working a number of trades to ensure that we can meet the minimum set of survivability needs. We do not intend to "largely give up protection against nuclear effects," but want to understand the relative costs and associated risks with lower levels of survivability. A good example of this was the effort in reaching a decision on the level of survivability for the Space-Based Infra-Red System. We recognized that we could not afford to satisfy the stressing survivability requirements required in the Cold War era but that there were options to satisfy less stressing requirements. Through various techniques that include hardening and other means, we are able to design a system that satisfies the requirements as validated by the Joint Requirements Oversight Council, provides acceptable risk, and is affordable.

We have not abandoned nuclear hardening in future programs. The USD(A&T) has directed a corporate review of DOD radiation hardening needs for the future to determine if they can be supported by the commercial sector, and if not, then what investment options are appropriate. This report, which is planned to be completed in the September 1996 time frame, will also deal with the consequences of not hardening DOD systems.

Mr. HALL. [Deleted.]

QUESTIONS SUBMITTED BY SENATOR DIRK KEMPTHORNE

RUSSIAN MILITARY SPACE PROGRAM

Senator KEMPTHORNE. General Ashy, how extensive is Russia's ongoing military space program? How much do you estimate Russia spends on its military space program? Is the Mir space station part of Russia's military space program?

General ASHY. [Deleted.]

Senator KEMPTHORNE. Mr. Hall, I have an ongoing interest in preserving the Senate's constitutional responsibility to confirm presidential nominees. As you know, the position of Director of the National Reconnaissance Office (NRO) requires Senate confirmation. As the Acting Director of the NRO, what steps are you taking to insure you do not usurp the Senate's prerogatives? What powers or authorities are you not exercising while you await possible Senate confirmation? Please be specific.

Mr. HALL. I appreciate the opportunity to answer this very important question. I am acutely aware of the Senate's responsibility to confirm Presidential appointees, and I have taken the necessary steps to assure that while serving as Acting Director of the NRO I do not intrude upon those prerogatives.

First, it should be noted that it is the position of Assistant Secretary of the Air Force for Space (ASAF(S)) that requires Presidential appointment and Senate confirmation. Even though the position of Director, NRO, is not subject to confirmation, the person serving as ASAF(S) has traditionally also served as Director, NRO. In the past, the incumbent Deputy Director has served as Acting Director until appointment and confirmation of the ASAF(S). For example, in March 1993 upon the resignation of ASAF(S) Mr. Martin Faga, the Deputy Director, Mr. Jimmie D. Hill, served as Acting Director until the confirmation of Mr. Jeffery K. Harris in May, 1994. Similarly, Mr. Hill also served as Acting Director during the period from 16 December 1988, when Mr. Pete Aldridge left the NRO, until 26 September 1989 when Mr. Faga came onboard. With this background in mind, I have tried to insure that my actions as Deputy Director, NRO and Acting Director, NRO are tailored to preserve the Senate prerogatives inherent in the confirmation process.

The DCI's 28 February 1996 memorandum to me, entitled "Service as Acting Director, National Reconnaissance Office" (copy attached) specifically instructed me not to perform any duties or responsibilities of, or assume the "trappings" of, the position of Assistant Secretary of the Air Force for Space. I read this as clear and unequivocal DCI direction to take no action that could impact in any way upon the Senate's confirmation prerogatives with respect to the next nominee for ASAF(S), whether that individual be me or anyone else.

Immediately after my appointment as DDNRO, I requested advice from the NRO General Counsel concerning specific limitations on my authorities a "can do" and "can't do" list. Moreover, I gave specific guidance that if there was any doubt, they should resolve the issue in favor of the more limiting approach. Accordingly, that Office advised me that could not perform the following functions in my capacity as Acting Director:

- Sign any documents using the title of ASAF(S) or use any stationery or other materials associated with that position.
- Exercise any duties or responsibilities specifically assigned to ASAF(S) by Secretary of the Air Force Orders, Instructions or directions.
- Use any travel perks or benefits intended for the ASAF(S) by virtue of that position, e.g. parking spaces, Air Force Government vehicles, military drivers and so forth.
- Represent myself at any meeting as or speaking for ASAF(S), or purporting to make any decision in the capacity of ASAF(S).
- Approve any awards in the capacity of ASAF(S).
- Participate in any Air Force functions as a senior Air Force official.

I believe that I have strictly and carefully followed this advice. In my first town meeting, I emphasized to the NRO populace that I have no authority whatsoever to act as ASAF(S) and that I relied upon them to keep any matters under that official's jurisdiction away from me. In addition, I have asked my Chief of Staff to screen out potential ASAF(S) interest items so that I have no responsibility for them. Finally, my Office of General Counsel is consulted on a regular basis to ensure any questions are resolved before they get to me.

Attachment:
DCI Memorandum, dated 28 February 1996.

THE DIRECTOR OF CENTRAL INTELLIGENCE,
Washington, DC, February 28, 1996.

Memorandum for: Keith R. Hall.
Subject: Service as Acting Director, National Reconnaissance office.

I write to instruct you on the limits of your role as Deputy Director and Acting Director of the National Reconnaissance Office (NRO) You are taking over this organization under unique circumstances where strong management is needed. However, as you know, the Assistant secretary of the Air Force for space normally serves as Director of the NRO. The Assistant secretary position requires a presidential nomination and Senate confirmation. Therefore, it is important that you carry out your activities in a manner that does not create the appearance that you are assuming the additional authorities or the formal manifestations of this office, which you do not hold.

In particular you should:

1. Limit your actions to those that can be taken in your capacity as Deputy Director or as Acting Director in the absence of the Director.
2. Not occupy the space or assume any trappings of the Office of the Assistant Secretary of the Air Force for space.

If you have any questions about these instructions, please let me know. If any matters arise as to which you are uncertain on how to proceed, please contact me directly.

JOHN DEUTCH.

QUESTIONS SUBMITTED BY SENATOR J. JAMES EXON

JAMMING THREAT TO GPS-AIDED PRECISION MUNITIONS

Senator EXON. General Dickman and Mr. Davis, the National Academy's study of the future of the Global Positioning System (GPS) raises concerns about the jam-resistance of the large numbers of precision U.S. air-delivered weapons now in development that will rely on GPS signals to achieve their terminal accuracy requirements. The National Academy study indicates that hockey- puck sized jammers, producible at costs of a few hundred dollars apiece, can jam the ability of GPS-guided munitions to acquire the GPS signals over a substantial range. Yet the Services are currently investing heavily in the development of many different precision air-delivered munitions, most of which use GPS for terminal guidance accuracy. What are your plans, if any, to cope with this jamming threat to precision munitions?

Mr. DAVIS. Since the inception of GPS, the DOD has acknowledged the potential vulnerability of its low-power signals to jamming. Elements of the GPS military system design, such as the spread-spectrum Y-code signal, close coupling with inertial reference systems, and adaptive nulling antennas, improve the anti-jamming performance of the Precise Positioning Service over generally available Standard Positioning Service. Further, prior to the release of the National Academy study, both the Air Force Scientific Advisory Board and the Defense Science Board had completed comprehensive studies specifically directed toward the GPS jamming situation.

Based on the recommendations of the Defense Science Board, the DOD initiated a Navigation Warfare (Navwar) effort to further improve the tactical anti-jamming performance of our GPS equipment, in platforms as well as munitions, and to locally prevent the use of generally available GPS services by our adversaries. These capabilities, once operationally deployed, will address one of the considerations in a subsequent decision to terminate the use of the GPS Selective Availability feature.

INFORMATION DOMINANCE VULNERABILITIES

Senator EXON. Gentlemen, I note that all of you, to one degree or another, plan for increased use of technologies borrowed from the commercial world. This increasing reliance on the commercial world raises questions of future vulnerabilities of both commercial and military computer-based information systems to both casual hackers and hostile agents. Can you briefly outline how each of your organizations goes about searching for possible vulnerabilities in your architectures and systems?

Who does the searching? Are they part of your development teams, or are they outsiders, working as a kind of "Red Team" activity? How are their efforts funded?

Mr. DAVIS. Senator, I don't think there is a simple answer to your question and it has to be addressed at several levels. As you know, the DOD is acutely aware of the threat posed by Information Warfare and, for some years, has been both mindful of system vulnerabilities and pursuing system defenses. The Department-wide effort is led by the Information Warfare Directorate within the Office of the Assistant Secretary of Defense, Command, Control, Communications and Intelligence. Their job is to orchestrate a joint DOD/Service approach to this growing problem and to establish policy for all information handling systems, including satellite communications (satcom). They are aided in their work by the Defense Intelligence Agency and the National Security Agency among others.

Each of the Services maintains a robust Information Warfare effort as well. They coordinate their programs with the OSD level group but focus their energies on Service specific problems, both technical and operational. Similarly, individual program offices and operational agencies deal with this issue as it relates to their specific programs and activities.

Now that is a long way of saying that there are numerous actors whose responsibility it is to oversee and conduct our information warfare tasks and they all approach this job from different directions. Some of the Services chose to "Red Team" their systems, others assign it as an internal activity. We have segments of some organizations who specialize in these types of analyses. NSA and DIA both are heavily involved. The funding picture is just as mixed.

That's the big picture. If I focus in more on your specific question, the answer is, "Yes." Yes, we plan to use more commercial technology and yes, that carries with it a cost in vulnerability. But it should not be insurmountable. The DOD has, for years, maintained a policy that all communications via satellite be encrypted. That policy does not change for commercial or commercial-like satcom and it raises the "information protection level" for those systems above their civilian equivalents. Several years ago the Department promulgated a policy that the DOD would not use commercial satcom unless the telemetry, tracking and control (TT&C) functions, as well as the communications themselves, were encrypted. Today, all the commercial systems we use meet that requirement. Once again, information surety is increased.

It takes more than these two to yield the level of protection we need, and those needs have to be analyzed on a case-by-case basis. Each mission, each system must be evaluated individually.

The requirements question that Gen. Ashy is trying to answer is, "How much highly protected communication capability do I need and how much can afford to be less protected?" General Dickman's architectural response must take that requirement into account and marry it with types of service, such as highly robust EHF to less well protected personal communications services, to produce an architecture that spans the range of needs. The system developer will take those architectural components and use information surety as one of his design elements. Finally, the communication user in the field will evaluate the range of services available and request service aboard the carrier that meets his specific mission needs.

Each of these levels contributes to the overall information dominance picture but no one person is in charge. I think that's the right answer because the range of applications, systems, and needs is too broad for a centralized, "one-size-fits-all" approach. The bottom line is that we recognize the problem and the fact that it increases as we move to commercial systems. This doesn't mean we shouldn't use commercial or commercial-like capabilities. Instead it means we must factor information surety considerations into how we use them, where we use them, and those modifications we require to make them meet our needs.

Mr. HALL. [Deleted.]

(U) The primary focus in protecting the Management Information System (MIS) against vulnerabilities in eliminating weaknesses before they become part of the network. The NRO MIS network has two such features which make it far less vulnerable to casual hackers and hostile agents and distinguish it from most other government and commercial networks.

[Deleted.]

(U) As a result of the distinct characteristics of the NRO MIS mentioned above, the potential threat to the network has been relatively low. Security considerations, applications, and practices were designed into the network from the beginning and a thorough assessment, conducted by NRO independent teams of network security specialists and system developers, is performed each time the network changes or grows. These considerations, applications, practices and assessments assist in the identification of potential vulnerabilities. Security of the network is a prime consideration and to date, has been relatively easy to insure using the vulnerability assessments completed as part of every network modification.

[Deleted.]

(U) The NRO does not currently have an outside "red-team" activity in place to verify network security. Given the distinctive characteristics of the network, and the careful security assessment which is an integral part of every development effort, such an effort has been considered unwarranted. As we migrate to a more mainstream architecture and install an improved intrusion detection system, it will be more appropriate to initiate such an independent effort. Preliminary plans are in work, but only in the early stages.

(U) In summary, the NRO's unique architecture and "closed" network has kept system vulnerabilities extremely low. We have focused all efforts on designing out potential vulnerabilities, rather than searching for existing ones. We are aggressively working several defensive Information Warfare projects to further safeguard the network against generic vulnerabilities. As we expand beyond our closed network and migrate to a larger, more mainstream architecture, we are evaluating the need for, and the structure of, a program to more actively test for weaknesses in the network.

MORE BUREAUCRATIC LAYERS?

Senator EXON. Gentlemen, a very simple question about simplifying and downsizing Government. As I read through your testimony, I note you have created two new offices called the DUSD(Space) office, and the "DOD Space Architect" office and you have created a new board, called the "Joint Space Management Board." The functions and purposes of each are no doubt important, but is this *yet another* layer of management *added* to the existing DOD, NRO, and CIA bureaucracies? What offices, if any, in each of these agencies were *abolished* as part of this streamlining and coordination? Mr. Davis, in your statement, you indicate you have three deputies reporting to you—are these new positions, or were equivalent "deputy" positions abolished elsewhere in DOD to provide you with these positions?

Mr. DAVIS. The establishment of the DUSD(Space), DOD Space Architect, and JSMB do not create an additional layer of bureaucracy. In fact, all of these organizations were created as a result of Congressional concerns over the management of DOD space, recommendations of the Defense Management Review of national security space activities, and the findings of the Commission on the Roles and Missions of the Armed Services. Each was established to strengthen the organization and management of national security space activities. The Office of the Deputy Under Secretary of Defense for Space was formed in March 1995 to consolidate responsibilities and functions for space policy, acquisition, and architectures within the Office of the Secretary of Defense (OSD). These responsibilities and functions formerly were divided among several OSD organizations. All of the billets to stand-up the organization were realigned from within OUSD(A&T), OUSD(P), and OASD(C^3I). The three deputy positions which were established in DUSD(Space) are Senior Executive Service level that were reassigned from existing positions within the Office of the Secretary of Defense.

The DOD Space Architect organization was formed in September 1995 to develop an integrated defense space architecture in coordination with the intelligence community. The space architecture responsibilities were transferred and consolidated within this organization. All personnel in this organization were reassigned from other Services and Defense Agencies who gave up slots to support the establishment of the Space Architect organization.

The Joint Space Management Board was formed in December 1995, bringing together the leadership of defense space and intelligence space sectors to provide an integrated executive level forum for national security space issues. The purpose of the JSMB is to ensure that defense and intelligence needs for space systems are completely satisfied within available resources using integrated architectures. The JSMB will actually facilitate and streamline the decision making process for major space issues which require senior level review and action.

Mr. HALL. (U) Although the creation of the Joint Space Management Board (JSMB), Deputy Undersecretary of Defense (Space), and the DOD Space Architect appears to introduce additional layers of management, all three represent a new, consolidated approach to managing our Nation's national security space resources.

(U) The Joint Space Management Board (JSMB) is a new forum which we believe will go a long way towards ensuring that defense and intelligence needs for space systems are comprehensively satisfied within available resources. The JSMB meets as needed and provides an unprecedented opportunity to address issues across the policy, requirements, architectures, acquisition, and funding spectrums for both intelligence and defense space programs. Membership includes senior representatives from established positions within both communities—no new organizations or positions were created to support the JSMB. Having both DOD and Intelligence space programs reviewed by a joint board ensures the Nation gets the best solution for its limited resources.

(U) Similarly, improved coordination and communication is occurring between the NRO and the DUSD Space and DOD Space Architect offices and we are working to determine areas where we can best contribute to each other's missions in the future. For example, as a result of the ongoing DOD Milsatcom architecture development effort, the NRO is creating an Integrated Product Team (IPT) to review its future data relay requirements. Once underway, the NRO IPT's work will grow and merge with the DOD Space Architect's work on satellite relay systems. In addition, the NRO is in the process of selecting a liaison officer—from its existing staff—to work within the DOD Space Architect's office and a member of the DOD staff recently joined the NRO's Plans and Analysis staff.

(U) No new organizational structures or positions are necessary for the NRO to interface effectively with these three organizations. Nor, has the creation of the JSMB, DUSD Space, and the DOD Space Architect eliminated any previously existing NRO positions. It is important to remember that the overarching objective for the JSMB, the DUSD (Space), and the DOD Space, Architect—in concert with the NRO—is to produce the most affordable and effective national security space systems for our country. Our ultimate goal remains the elimination of redundant and overlapping architectures, and expedient delivery of critical space data to our customer.

GPS "SELECTIVE AVAILABILITY"

Senator EXON. Mr. Davis, Section 278 of the FY 1996 Defense Authorization Act requires DOD to turn off the "Selective Availability" feature of the Global Positioning System effective May 1, 1996, *unless* the Secretary of Defense provides the Defense Committees with a detailed plan for future civil and military use of unaltered GPS by us and our allies, while denying potential foes the use of such signals. With that date now only 40 days away, will DOD have provided the Congress with such a report by the deadline?

Mr. DAVIS. Yes. The Department is now in the final stages of staffing the required plan for release to the Committees by May 1, 1996.

[Whereupon, at 11 a.m., the hearing was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1997 AND THE FUTURE YEARS DEFENSE PROGRAM

MONDAY, MARCH 25, 1996

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

BALLISTIC MISSILE DEFENSE PROGRAMS AND ISSUES

The subcommittee met, pursuant to notice, at 2:08 p.m., in room SR–222, Russell Senate Office Building, Senator Trent Lott (chairman of the subcommittee) presiding.

Committee members present: Senators Lott, Smith, Nunn and Bryan.

Professional staff member present: Eric H. Thoemmes.

Minority staff members present: Andrew S. Effron, minority counsel; and William E. Hoehn, Jr., professional staff member.

Staff assistants present: Shawn H. Edwards and Franklin H. Turner.

Committee members' assistants present: Samuel D. Adcock, assistant to Senator Lott; Thomas L. Lankford, assistant to Senator Smith; Andrew W. Johnson, assistant to Senator Exon; Richard W. Fieldhouse, assistant to Senator Levin; and Mary Weaver Bennett, assistant to Senator Bryan.

Committee members' fellows present: Thurston E. Womble, fellow to Senator Lott; LTC Max H. Della Pia, fellow to Senator Levin; Linda Taylor, fellow to Senator Bingaman; LTC Michael W. DeYoung, fellow to Senator Bryan.

OPENING STATEMENT OF SENATOR TRENT LOTT

Senator LOTT. The committee will come to order.

The Strategic Forces Subcommittee meets today to receive testimony on the U.S. ballistic missile defense programs and their requirements. I would like to welcome Lieutenant General Malcolm R. O'Neill, Director of the Ballistic Missile Defense Organization. General O'Neill, I understand that you may be retiring soon, and I just want to express to you our appreciation for your work over the years. It has been a pleasure working with you. I think you have done outstanding work, and we want to thank you for your service and your contribution to the BMD effort, and assure you that we are going to miss your leadership, and we will miss you at these congressional hearings in the future, but we are glad to have you here today.

Senator Exon had indicated last week, at our last Strategic Forces Subcommittee, he might not be able to be here, but I understand Senator Nunn will be arriving later on and will have a statement at that time, and when he arrives we will, of course, call on him to make that statement in any way that he sees fit.

On March 6th the Armed Services Committee held a hearing on the recent ballistic missile defense program review by Dr. Paul Kaminski, who conducted the review. Quite frankly, that hearing raised more questions than it answered, and I am personally very disappointed by many of the decisions that Dr. Kaminski has made. He seems to have elevated budget-driven decisionmaking to what I would consider a new level.

The decision to delay THAAD deployment by some 5 years, for example, takes a program that the Clinton administration used to refer to as the centerpiece of its BMD effort and makes it into an acquisition nightmare. From the date when THAAD could be ready for production till the time when it is actually deployed, 6 to 8 years will have expired. This is the opposite, I believe, of sensible and efficient acquisition. It hardly deserves to be called acquisition at all. If we follow this course we will waste money and time and in the end probably kill this vital program.

I am also bewildered by the administration's willingness to completely disregard the law that has been passed. Dr. Kaminski's BMD review was conducted as if Public Law 104–106 did not exist. The administration seems to have invented some new interpretation of the Constitution that allows them to only comply with those laws that they like. I do not know why the President even bothered to veto the defense authorization bill last year if he was planning to ignore it anyway after it became law.

Since we will have an opportunity during the question period to explore the detail of the implications of Dr. Kaminski's BMD review and the fiscal year 1997 BMDO budget request I will not detail all my concerns at this time. Let me simply say that the administration has now done to most of the TMD program what it did to the NMD program when it took office; that is completely derail it.

Ignoring our experience in the Gulf War, the administration has allowed a deficient defense budget to drive our strategy and most of our BMD programs into the ground. General O'Neill, I understand that these were not your decisions and that you were hardly even involved in a process that supported Dr. Kaminski's decisions. I find that in and of itself troubling. We set up an organization to be the advocate for BMD programs, then it is excluded from the most significant BMD decision of the year. Based on this and many other factors, I cannot avoid the conclusion that the so-called review was little more than an exercise designed to rationalize deep cuts in the BMD program.

So at this point, General O'Neill, I welcome you again, and we would be pleased to have your statement.

STATEMENT OF LT. GEN. MALCOLM R. O'NEILL, USA, DIRECTOR, BALLISTIC MISSILE DEFENSE ORGANIZATION; ACCOMPANIED BY REAR ADM. TIM HOOD, NAVY PROGRAM EXECUTIVE OFFICER FOR THEATER AIR DEFENSE; MAJOR GEN. JOHN HAWLEY, AIR FORCE DIRECTOR OF GLOBAL POWER PROGRAMS/ASSISTANT SECRETARY FOR ACQUISITION; AND COL. DAN MONTGOMERY, ARMY PROGRAM EXECUTIVE OFFICER FOR MISSILE DEFENSE

General O'NEILL. Sir, I have a formal statement I would like to submit for the record.

Senator LOTT. It will be included in the record.

General O'NEILL. Mr. Chairman, it is my privilege to appear before you today to present our BMD program and budget for fiscal year '97. Before I begin my opening statement I want to take this opportunity to introduce to you the superb tri-service team that executes the Joint Ballistic Missile Defense Program.

To my left rear, Rear Admiral Tim Hood is the Navy's Program Executive Officer for Theater Air Defense. Next to him, Major General John Hawley is the Air Force's Director of Global Power Programs and Assistant Secretary for Acquisition. Next to him, Colonel promotable Dan Montgomery is the Army's newly appointed Program Executive Officer for Missile Defense. Dan has been on board for a week and a half, so if there are any particularly difficult questions about the Army elements of the program I will bring Dan up to answer those for you. [Laughter.]

Together we represent the team that will manage and execute the BMD program. I may turn to one of them later to help me answer particular questions.

As you are aware, and as you mentioned in your opening remarks, Dr. Kaminski conducted a program review which established specific guidance for my program over the next several years. The most significant result of the review was a reaffirmation of the Department's fundamental priorities for missile defense. The first priority remains defense against theater-class ballistic missiles, which represent a threat that is here and now. The next priority is to develop the capability which can be rapidly deployed to defend against longer-range ballistic missiles that could threaten the United States. Finally, a technology-based program supports both TMD and NMD and advanced capabilities, to round out our BMD program.

I believe the BMD program that results from the program review is executable, and I support the allocation of BMD resources within the confines of a $2.8 billion budget ceiling. I recognize that while I advocate the importance of BMD programs in the Pentagon, I cannot speak for the relative priority of BMD programs within the overall defense budget. The total fiscal year 1997 budget request for BMD is $2.798 billion. We are requesting $1.794 billion for TMD RDT&E, and $268 million for TMD procurement efforts. We are putting rubber on the ramp with that $268 million.

The national missile defense deployment readiness R&D program is budgeted for $508 million, and support technologies is at $226 million. Of the total BMD budget request, TMD accounts for roughly 74 percent; NMD, 18 percent; and technology, 8 percent.

Our top priority remains fielding improved theater missile defenses. The TMD program continues to focus on three efforts to bring increasingly capable defenses to the war-fighter. First, we are putting rubber on the ramp now, and we will continue to do so. The prime examples of this activity are deployments of the Patriot PAC–2 guidance enhanced missile. The PAC–2 GEM, as we call it, has a capability four times, in terms of its defended footprint, that of the PAC–2 that was fielded in Desert Storm.

The U.S. Marine Corps is also upgrading the HAWK. Delivery of these upgraded PAC–2 and HAWK systems to operational units will continue during this fiscal year. These programs are delivering real improvements in military capability against short-range missile threats for a modest investment.

Just as important, we have deployed significant improvements to our ability to provide early warning information of ballistic missile launches against U.S. forces. Last year, the Air Force activated the Attack and Launch Early Reporting to Theater—or ALERT—squadron, with a BMDO developed Talon Shield system at Falcon Air Force Base, Colorado. This gets served digital data very rapidly based upon the DSP notifying us of an enemy launch.

The joint tactical ground system, also developed by BMDO, is a complementary tactical mobile DSP ground station for use in the theater. The Army has deployed two prototypical units, one in Germany and one in South Korea, to support the war-fighter. Five of these units will be produced and fielded in fiscal years 1996 and 1997. Following these near-term improvements the Department will continue efforts to develop and acquire a set of core TMD programs. The Department program review established a TMD lower tier system, PAC–3, and Navy area defense as the first priority to ensure we enhance our defensive capabilities against short to medium-ranged ballistic missiles as quickly as possible. We will do this by building on existing infrastructure and prior investments, expanding the capabilities of Patriot and Aegis standard missile systems, adding funds to deal with cost increases and development delays, exploring a concept for cooperative development with our allies for a medium extended air defense system called MEADS, and improving battle management command and control and communication.

In order to ensure that we field the lower tier TMD systems as early as possible, the Department increased investment in both PAC–3 and Navy area defense. PAC–3 was increased by $345 million, and the Navy area defense program by $186 million over FYDP. These increases will allow us to begin PAC–3 deployment and Navy area defense user operational evaluation system deployment in fiscal years 1999 and 2000 respectively.

During the program review, THAAD was reduced in scope while maintaining focus on achieving UOES, which is user operational evaluation system, capability before the end of the decade. Prior to the program review, THAAD's funding profile was on the order of about $700 million per year; however, the review adjusted the program significantly, making out-year adjustments to our TMD program. The Department decided to keep the UOES portion of the program on track, which will entail obtaining an initial capability for UOES in '98. However, the program review restructured the remainder of the THAAD effort, taking about $1.9 billion out of the $4.7 billion that was programmed through the FYDP.

The initial deployment will be with what the Department calls a UOES-plus system, essentially a system based on the UOES prototype in lieu of a previously planned full capability objective system. This new capability will meet the most critical of THAAD's requirements. It will concentrate on militarizing the UOES design, and upgrading certain components such as the infrared seeker, radar, and BMC3. The resulting THAAD program delays the production ramp-up and the FUE—the first unit equipped—from 2 to 4 years.

With regard to Navy theater-wide, it became clear last year that the Congress was interested in a very aggressive development effort. While the program review was in progress, Congress appropriated a substantial increase—$170 million—for this program. As a result, the program review directed execution of a combined effort to both define the optimal interceptor concept and conduct a system technology demonstration.

In order to accomplish this approach, the Department made a substantial increase to the funding profile. While starting out at a slow pace, the Department will add about $600 million through the FYDP to ramp-up to a significant annual investment in Navy theater-wide. We will continue developing the Medium Extended Air Defense System—MEADS—during fiscal year '97. This system is different from the other lower tier missile defense systems that we are planning to deploy.

For example, while PAC–3 is oriented on a particular threat direction, MEADS provides 360 degrees of coverage. MEADS will also be a highly mobile system, designed to be deployed with forward and maneuvering Army and Marine forces. Within the next few weeks the U.S., France, Germany, and Italy will sign a memorandum of understanding to jointly execute the program definition and validation phase of the MEADS program.

The joint TMD program element, which is part of my budget, represents tasks that are vital to the execution of joint TMD programs. These activities have been grouped together because they provide direct support across TMD acquisition programs which could not be executed without this support. These activities include architecture development; battle management; command-control-communications; test and evaluation support, including development and fabrication of targets; threat analysis and support; modeling; and simulation.

While this may not seem to be as exciting as building improved interceptors, it is absolutely critical to the success of the U.S. TMD program. It is the glue that holds the architecture for TMD together, and will ensure that the whole is greater than the sum of its parts.

In the area of cruise missile defense, BMDO continues to play a major role. In particular, the lower tier PAC–3, Navy area defense, and eventually the MEADS system, will operate in the same battle space and will have significant capabilities against the cruise missile threat. In addition, the NMD/BMC3 architecture, through the direction of Dr. Kaminski, will be designed to promote interoperability, and evolution of a common BMC3 system for ballistic and cruise missile defense.

In the NMD area, it is our goal to position the U.S. to effectively respond to a strategic ballistic missile threat when it emerges. Based upon the program review, the NMD effort has been shifted from a technology readiness to a deployment readiness program. The Department is sensitive to congressional interest in a shift to a more system-oriented approach which would provide for the balanced development of all elements necessary for an initial deployment.

We are focusing our efforts on a program that is referred to as three plus three, a 3-year development and planning phase which, if necessary, could be followed by a 3-year system acquisition and deployment phase. The Department is committed to the development phase, or the first 3 years of this three plus three program. During this period the BMDO, supported by the services, will develop and begin testing the elements of an initial system. If, at the end of these 3 years, the ballistic missile threat to the United States warrants deployment of an NMD system, then in another 3 years that system could be deployed.

Based on this program, an initial operational capability could be achieved in approximately 6 years, or by the year 2003. If the threat does not warrant deployment of an NMD system, the Department's three plus three program is designed to preserve the capability to deploy within 3 years by continuing development of system elements and conducting integrative tests. Over time, these efforts would allow us to enhance both the technology base and the demonstrated performance of the system we decide to deploy.

System capability would grow through several avenues: Advanced technology, increasing element performance, and adding additional elements. For example, the U.S. Air Force's space and missile tracking system would be integrated into our proposed architecture as soon as it was available to enhance overall NMD performance.

As I testified last year, the SMTS system provides a vital role for both national missile defense and theater missile defense. Funding for national missile defense has been shifted forward in the FYDP, with allocation of an additional $100 million per year in fiscal years 1997 and 1998. This increase, coupled with the additional funds provided by Congress for NMD in fiscal year 1996, will allow us to complete a reasonable, albeit high risk, development program leading to the demonstration of the NMB system through an integrated system test in fiscal year 1999.

The NMD system we will demonstrate in 1999 includes a ground-based interceptor, ground-based radar, early warning sensors, and battle management command and control and communication. Depending on the threat to which we are responding when a deployment is required, these elements could be combined in a treaty-compliant deployment, or some other architecture. Deployment of an initial system would cost approximately $5 billion. The intrinsic strength of our concept for initial deployment is that the architecture has been specifically designed for evolutionary development of more robust and effective NMD systems over time. It can grow to counter an increasingly sophisticated threat, if required.

As we move forward with our acquisition programs, the programmatic demands on our BMD resources have continued. I am concerned that this has forced us to reduce our technology program. I would like to remind the committee that today's acquisition programs are possible only because significant past investments in BMD technology made them possible. I believe the proper development of technology to meet these critical requirements is essential to maintaining our program's technological edge.

I want to stress that nowhere else in the Department of Defense are the basic or component BMD technology programs funded. Therefore, to ensure the continued flow of new solutions to meet evolving BMD requirements, I encourage the Congress to consider the BMD advanced technology program as a strategic investment. I believe this investment is critical to the continued success and viability of our BMD program.

In closing, Mr. Chairman, the BMD program today is a focused, prudent response to the real world. We are aggressively working to meet existing and emerging ballistic missile threats, first to our forces overseas, as well as our friends and allies, and second, the emerging missile threat to the United States. I am dedicated to ensuring that we field improved TMD systems ASAP, to provide real protection for our forward-deployed forces, friends, and allies.

We have made strong progress in developing and acquiring these improved systems. We have made this progress because of the strong and enduring executive legislative consensus on theater missile defense. This consensus is directly responsible for ensuring consistent program direction and the stable allocation of resources to get the job done. This support must continue if we are to continue on our collective promise to give the war-fighter the protection he needs in a world with proliferating threats.

Mr. Chairman, I strongly endorse staying the course with the Department's NMD strategy. The program acknowledges that some potentially adversarial nations are interested in developing longer-range ballistic missiles which could strike the United States. The three plus three program could deploy an effective, nationwide NMD system against a first-generation Third World threat by the year 2003. However, if that threat develops sooner we have options which could deploy an emergency NMD system at an earlier date.

I think it is critical that we work closely together on a bipartisan basis to form the consensus for NMD that the TMD program has long enjoyed. Such a course is required if we are to succeed in maintaining program stability and coherence. The success of NMD depends upon our ability to reach this consensus.

On a more personal note, as you said, Mr. Chairman, I have announced my intention to retire. Therefore, I would like to express at this time my deep appreciation for the working relationship I have enjoyed with the members and the staff of this committee. In particular, I would like to express my thanks to Eric Thoemmes and Bill Hoehn for all their efforts on behalf of BMD programs over the years.

Of course, there is much more to be done, and we will need your help to make missile defense a reality. I trust the future Director of BMDO has the opportunity to work closely with you, Mr. Chairman, and all the members of this committee. That experience has been a great honor, and a privilege for me.

Sir, that completes my opening remarks. I am available for your questions.

[The prepared statement of General O'Neill follows:]

PREPARED STATEMENT BY LT. GEN. MALCOLM R. O'NEILL

Mr. Chairman and Members of the Committee, it is my privilege to appear before you today to present the Department's Ballistic Missile Defense (BMD) program and budget for fiscal year 1997.

As you are aware, the Department has recently completed the BMD Program Review, which was conducted by Dr. Paul Kaminski the Under Secretary of Defense for Acquisition and Technology. The Program Review established specific guidance for the BMD program over the next several years. The most significant result of the review was a reaffirmation of the Department's fundamental priorities for missile defense. The first priority remains defense against theater-class ballistic missiles, which represent a threat that is here and now. This next priority is to develop the capability to defend against longer-range ballistic missiles that could threaten the U.S. alter the turn of the century. Finally, technology base programs to support both TMD and NMD round out the Department's BMD program.

Fiscal Year 1997 Program and Budget. The total fiscal year 1997 budget request for BMD is $2.798 billion. The Department is requesting $1.794 billion for Theater Missile Defense (TMD) RDT&E, and $268 million for TMD procurement efforts. The National Missile Defense) Deployment Readiness RDT&E program is budgeted for $508 million. Support Technologies budget request is for $226 million. Table A provides a detailed perspective on funding for fiscal years 1996 and 1997. Of the total BMD budget request for fiscal year 1997, TMD accounts for roughly 74 percent, NMD 18 percent and Technology 8 percent. This is presented on Table B.

As the Committee is aware, BMDO leads the Department of Defense team that executes the BMD program. My staff and I work closely and cooperatively with the Services as we seek to develop and acquire BMD systems. In this regard, BMDO interacts with the CINCs to ensure that as we develop BMD systems we respond to the specific needs Of the warfighter. BMDO works closely with the Service Program Executive Officers (PEOs) to execute key BMD acquisition programs and put real capability into the hands of our military forces. Table C Illustrates the important role the Military Services play in executing various segments of the BMD program. Using the total fiscal year 1997 dollars allocated to the Services and BMDO for BMD programs, you can see that the Army executes roughly 60 percent of the BMD programs, while BMD0 executes 17 percent, the Navy 16 percent, the Air Force 5 percent, and other Defense entities 2 percent. The important lesson to draw from these percentages is that the BMD program is a. program that requires well-coordinated management and execution. We strongly benefit from the Services' technical and programmatic expertise. Meanwhile, BMDO ensures that BMD programs are advocated during budget debates; prevents duplication of BMD program efforts across the Services; sponsors joint development of BMD systems; ensures focus on joint warfighter needs; and concentrates on near-term acquisition programs while judiciously investing in far term technologies. Of special significance, BMDO is responsible for designing the appropriate battle management, command, control and communications that will ensure BMD systems are fully integrated. I am pleased to report that this approach to BMD program management has succeeded in combining the strengths of the Services and BMDO, which enable us to develop and acquire improved BMD systems and further develop critical military technologies.

Last, I would like to address a management issue that has been of keen interest to the Congress since the fiscal year 1993 Defense Authorization Act. This is especially important in the context of concerns about the size of overall BMD program management and the proper role of BMDO as the central manager of the Department's BMD program. Table D illustrates that BMDO has in fact complied with Congressional direction to maintain a lean management structure and reduce its use of support service contractors. The chart shows an overall reduction of 1,075 support service contractors, with a modest increase in Government employees to ensure effective and efficient management of the program. This management structure allows BMDO to perform its responsibilities, as outlined in its charter and Congressional direction.

BALLISTIC MISSILE DEFENSE ORGANIZATION

TY $ In Millions

Program Element	[illegible] Program [illegible]	Budget Activity	FY 95 Actual	FY 96 Estimate	FY 97 Estimate
Procurement					
• 0208861C	THAAD System Procurement	–	0.000	0.000	0.000
• 0208863C	HAWK Procurement	–	3.831	5.046	19.379
• 0208864C	TMD - BM/C³ Procurement	–	0.000	31.996	19.256
• 0208865C	PAC-3 Procurement	–	251.106	288.892	220.255
• 0208867C	Navy Area Wide	–	14.496	16.380	9.160
	Procurement Total		269.433	342.314	268.050
RDT&E					
• 0602173C	Support Technology / Applied Research	02	80.946	89.230	94.023
• 0603173C	Support Technology - Advanced Tech Development	03	126.582	125.537	132.319
• 0603861C	THAAD System - Dem / Val	04	622.377	554.755	269.000
• 0603863C	HAWK - Dem / Val	04	26.600	22.312	0.000
• 0603864C	TMD - BM/C³ - Dem / Val	04	19.693	23.160	0.000
• 0603867C	Navy Area Wide - Dem / Val	04	139.634	167.256	60.000
• 0603868C	Navy Theater Wide - Dem / Val	04	76.000	194.565	58.171
• 0603869C	Corps SAM - Dem / Val	04	14.223	19.675	56.232
• 0603870C	BPI - Dem / Val	04	40.610	0.000	0.000
• 0603871C	National Missile Defense - Dem / Val	04	387.105	720.750	508.437
• 0603872C	Joint Theater Missile Defense - Dem / Val	04	408.447	421.165	520.111
• 0604861C	THAAD System - EMD	05	0.000	0.000	212.798
• 0604864C	TMD - BM/C³ - EMD	05	0.000	13.865	0.000
• 0604865C	PAC-3 - EMD	05	275.450	359.008	376.632
• 0604866C	PAC-3 Risk - EMD	05	69.326	16.967	0.000
• 0604867C	Navy Area Wide - EMD	05	0.000	95.732	241.582
• 0605218C	Management	08	157.435	146.530	0.000
	RDT&E Total		2,444.032	2,992.549	2,529.305
MILCON					
• 0603871C	National Missile Defense	–	0.323	0.832	0.000
• 0603872C	Joint Theater Missile Defense	–	0.000	2.577	1.404
• 0604861C	THAAD System	–	0.000	13.600	0.000
	MILCON Total		0.323	17.009	1.404
	BMDO Total		2,713.788	3,351.872	2,798.759

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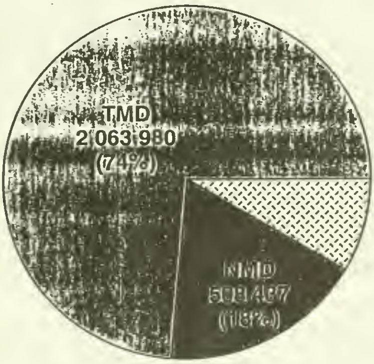
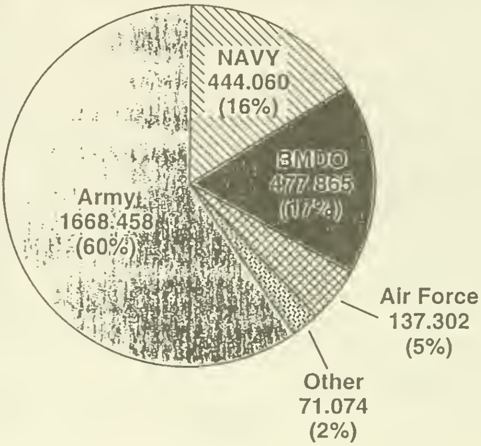
FY 97 BMDO FUNDING

(TY $ In Millions)



FY 97 BMDO FUNDING BY EXECUTING AGENT

(TY $ In Millions)



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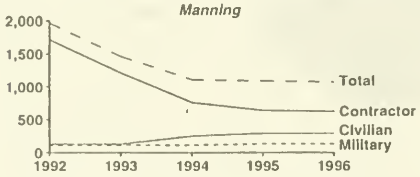
BMDO WORK FORCE

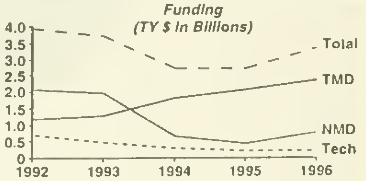
Manning

	FY 92	FY 93	FY 94	FY 95	FY 96	Delta FY 92 - 96
Civilian	143	143	243	290	300	157
Military	116	116	118	140	139	23
Contractor	1,700	1,200	750	650	625	-1,075
Total	1,959	1,459	1,111	1,080	1,064	-895

TY $ In Millions

	FY 92	FY 93	FY 94	FY 95	FY 96	Delta FY 92 - 96
TMD	1,163.1	1,278.2	1,808.2	2,071.6	2,367.0	1,203.9
NMD	2,087.5	1,950.8	637.7	418.9	749.5	-1,338.0
Tech	685.4	480.2	281.7	223.3	229.9	-455.5
Total	3,936.0	3,709.2	2,727.6	2,713.8	3,346.4	-589.6





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Theater Missile Defense: Priority to Field Improved Defenses. The TMD program continues to focus on three sequential efforts to bring increasingly capable defenses to the warfighter. First, we have completed our near-term improvements to existing air and missile defense systems to allow them to defend against short-range tactical ballistic missiles. Prime examples of this activity are deployments of Patriot PAC–2 Guidance Enhanced Missiles (GEM) and U.S. Marine Corps HAWK Upgrades. Our tests have shown that a modified TPS–59 radar combined with the HAWK missile system is effective against short range ballistic missiles. Delivery of the upgraded systems to operational Marine Corps units will continue during this fiscal year. This program delivers a real military capability against the short range missile threat for a modest investment. Last year, we began producing the PAC–2 GEM system for the Army as the principal improvement to our existing TMD capability until the PAC–3 system begins deployment in fiscal year 1999. The PAC–2 GEM improvements increase the PATRIOT's defended area and improves its lethality over its capabilities during Operation Desert Storm. The GEM's improved seeker performance allows the interceptor to more precisely locate the target missile. Meanwhile, a faster reacting warhead fuze contributes to a more optimal dispersal of warhead fragments on the target. Just as important, we have deployed significant improvements to our ability to provide early warning information of ballistic missile launches to U.S. forces overseas. Last year the Air Force activated the Attack and Launch Early Reporting to Theater (ALERT) squadron with the BMDO-developed TALON SHIELD system at Falcon Air Force Base, Colorado. The Joint Tactical Ground System (JTAGS), also developed by BMDO, is a complementary tactical mobile DSP ground station for use in the theater. The Army has deployed two prototypical units, one in Germany and one in South Korea, to support the warfighter. Five of these units will be produced and fielded in fiscal years 1996 and 1997.

Following these and other near-term improvements, the Department will continue efforts to develop and acquire a set of "core" TMD programs. The Department's Program Review established the TMD lower-tier systems—the PAC–3 and Navy Area Defense programs—as the first priority to ensure we enhance our defensive capabilities against short- to medium-range ballistic missiles as quickly as possible. We will do this by building on existing infrastructure and prior investments in ongoing programs; expanding the capabilities of the PATRIOT and AEGIS/standard Missile systems; adding hinds to deal with cost increases and development delays; exploring a concept for cooperative development with our Allies for a Medium Extended Air Defense System (MEADS); and improving our Battle Management, Command, Control and Communications (BMC^3) capability.

Neither the PAC–3 nor the Navy Area Defense programs involve show-stopping technical challenges at this point. Rather, they involve engineering challenges. Nonetheless, the key issue is a matter of execution of the programs to complete the development and to field these two systems. Our task is to ensure that we have a robust program to proceed with both these systems and to field this important capability as early as possible. Therefore, the Department increased the investment in PAC–3 and Navy Area Defense to ensure that they are adequately funded to guarantee timely delivery to the warfighter. The PAC–3 program was increased by $345 million and the Navy Area Defense program by $186 million over the Future Years Defense Plan (FYDP) through 1997–2001. These increases will allow us to begin both PAC–3 deployments and Navy Area Defense User Operational Evaluation System (UOES) deployments in fiscal year 1999. The mix of PAC–3 and Navy Area Defense interceptors eventually acquired to perform the lower-tier mission will depend upon their relative prices, performance and the status of the missile threat.

Patriot Advanced Capability—3. The PAC–3 system will represent a significant upgrade to an existing air and missile defense system to specifically handle stressing theater-class ballistic missile threats. The PAC–3 system, using hit-to-kill interceptors, will be highly lethal against ballistic missiles including those with weapons of mass destruction. Improvements to the system will result in increased firepower and lethality; increased battlespace and range; enhanced battlefield awareness; and improved discrimination performance. These critical enhancements will be achieved by improvements to the missile, as well as the radar and communications systems. Operational improvements, such as remote launch operations, will also increase the battlespace and range of the PAC–3 system. These enhancements will mark a substantial improvement over our PATRIOT TMD capabilities during Operation Desert Storm.

The PAC–3 program is restructured to reduce program risk, adjust for schedule delays, and improve system performance by extending the engineering and manufacturing development (EMD) phase of the program by up to 10 months; rephasing the missile and radar procurement; upgrading four launchers per battery with Enhanced Launcher Electronics Systems; and extending the battery's remote launch capability. The Program Review also visited the issue of the number of PAC–3 battalions to be fielded. The original plan was to deploy nine battalions. However, the review decided to field six battalions, while deferring fully upgrading the three additional battalions pending the completion of the MEADS program definition/validation phase. PAC–3 low rate initial production (LRIP) will begin the first quarter of fiscal year 1998, with the First Unit Equipped (FUE) date planned for the fourth quarter of fiscal year 1999.

Navy Area Defense. As the Committee is aware, BMDO and the Navy have been working cooperatively to develop an enhancement to the AEGIS/Standard Missile air defense system to provide a tactical ballistic missile defense capability from the sea that is comparable to the defense provided by PAC–3. This represents a critical TMD capability that can take advantage of the strength and presence of our naval forces, and build upon the existing AEGIS/Standard Missile infrastructure. Naval vessels that are routinely deployed worldwide are currently in potential threat areas or can be rapidly redirected or repositioned. A Naval TMD capability can be in place within a region of conflict to provide TMD protection for land-based assets before hostilities erupt or before land-based defenses can be transported into the theater. Our Navy Area Defense program focuses on modifications to enable tactical ballistic missile detection, tracking and engagement with a modified Standard Missile 2, Block IV.

We will use the $45 million added by Congress in the fiscal year 1996 Defense Authorization and Appropriations Bills to compensate for system engineering and design efforts not fully funded in fiscal year 1995. The Program Review added $186 million to Navy Area Defense through the FYDP in order to make it fully executable on a moderate risk profile. These funds will cover delays in risk reduction flights and adjusted cost estimates for test targets and lethality efforts. In turn, this will minimize the delays in the EMD program and LRIP missile procurement.

Our plan is to field a UOES capability in fiscal year 1999 and an FUE in fiscal year 2001. Thereafter, operational units will use the legacy UOES system for continued testing and as a contingency warfighting capability.

Theater High Altitude Area Defense. THAAD is the more mature upper-tier system. During the Program Review, the THAAD program was adjusted to maintain track on an early deployment of a UOES capability before the end of the decade. Prior to the Program Review, its funding profile was on the order of about $700 million per year. However, it adjusted the program significantly, making outyear adjustments to our investment in the program. The Department decided to keep the UOES portion of the program on track, which will entail fielding about 40 THAAD missiles and the GBR by fiscal year 1999. However, the Program Review restructured the rest of the program for the objective THAAD system, taking about $1.9 billion out of the $4.7 billion that was programmed through the FYDP.

The THAAD System is the only core TMD system capable of engaging the hill spectrum of theater-class ballistic missile threats. The THAAD system provides extended coverage for a greater diversity and dispersion of forces or the capability to protect population centers. But the principal additional capability provided by this important system is the ability to deal with longer range theater missile threats as they begin to evolve and emerge over time. Using THAAD as an overlay also reduces the number of missiles that the lower-tier systems must engage. The THAAD system will provide a unique capability for wide area defense against tactical ballistic missiles at higher altitudes and more attempted intercepts at longer ranges (a "shoot-look-shoot" capability) with a lethal hit-to-kill interceptor. This is a mission the PAC–3 and Navy Area Defense systems cannot perform. The THAAD system consists of the TMD Ground-based Radar (GBR) surveillance and tracking sensor, interceptors, launchers, and BMC^3.

The initial deployment will be with what the Department calls a "UOES plus" system, essentially an enhanced version of the UOES system, in lieu of the previously planned full-capability objective system. This improved UOES capability will meet the most critical THAAD requirements. It will concentrate an militarizing the UOES design and upgrading certain components, such as the infrared seeker, radar upgrades and BMC^3 improvements. The resulting THAAD program delays the production ramp-up and the FUE by over 2 years.

In fiscal year 1997, the THAAD program will conclude its demonstration/validation flight tests. These tests are designed to resolve technical issues and demonstrate the system's capabilities. So far, BMDO and the Army have conducted four flight tests. The next flight test, which will attempt an intercept of a theater-class ballistic missile target, is scheduled to take place within the next few days.

Navy Theater-Wide. The Navy Theater Wide system will bring a new, complementary capability to our other core programs by providing ascent phase coverage where the mobility of AEGIS ships allows such coverage. In addition, the system will add the same kind of terminal coverage capability as the THAAD system, providing long range coverage and wide area protection. As in the case with the lower-tier Navy

Area Defense system, the Navy Theater Wide system will operate free of sovereignty or host nation support issues, free to be deployed instantly whenever our national interest requires.

The Navy Theater Wide system is the least mature of all our systems, not only of the upper-tier, but all the TMD systems taken together. Prior to the Department's review, we were proposing funding this program in our fiscal year 1996 and 1997 budgets at a very low level to mature the key enabling technologies. This was at a level of about $30 million per year. During the review, however, Congress authorized and appropriated a substantial increase—$170 million—to this program. The Program Review decided to spend all the appropriated funds for fiscal year 1996 over 2 years and not begin a full commitment to the Navy Theater Wide program at this time. A more deliberate pace was selected, which will allow us to proceed to a system-level intercept flight test using a combination of the AEGIS Weapon System, the Standard Missile and a kinetic kill intercept vehicle.

In parallel, the program is structured to conduct concept definition studies to determine what is the best configuration with which to proceed. There is much synergism among the technologies needed for a robust Navy Theater Wide system, including seeker technologies being developed in the National Missile Defense program. The Program Review determined that the posture for this program is to conduct a technology demonstration, leveraging maturing technologies and complete a concept definition study to confirm the interceptor configuration for the system. In order to accomplish this program approach; the Department made a substantial increase to the funding profile. While starting out at a slow pace, we will add about $600 million through the FYDP to ramp up to a significant annual investment in Navy Theater Wide.

Medium Extended Air Defense System (MEADS). We will continue developing the MEADS system during fiscal year 1997. This system is different from the other lower-tier missile defense systems we are planning to deploy. For example, while the PAC–3 system is oriented in a particular threat direction, MEADS provides 360 degrees of coverage. It will be a highly mobile system and designed to be deployed with our forward and maneuvering forces. In this regard, MEADS is designed to respond to an important operational requirement by providing protection for the combat maneuver force against shorter-range theater-class ballistic missiles, advanced cruise missiles, and other air-breathing threats as well. This system will replace HAWK, and also would ultimately replace the PATRIOT system. As I noted earlier, the Department is deferring frilly upgrading three PATRIOT battalions pending a decision on development and deployment of MEADS.

Later this month, the United States, France, Germany and Italy will sign a Memorandum of Understanding (MOU) to proceed jointly to develop the MEADS system. MEADS consolidates and harmonizes the efforts of NATO allies who had contemplated country-unique systems, such as the TLVS in Germany, Aster/Arabel in France and Italy, and Corps SAM for the U.S. The agreement to pursue MEADS represents not only a new path for transatlantic armaments cooperation, but also a growing recognition of the risks to alliance security posed by the proliferation of weapons of mass destruction and their delivery systems. The cost share for the MEADS program throughout the Program Definition and Validation (PDV) phase (the U.S. equivalent of demonstration/validation) is 50/20/20/10 among the U.S., France, Germany, and Italy, respectively. The Department added $85 million over the FYDP to fund the U.S. share of the cooperative PDV phase, which concludes in fiscal year 1999. This increase brings our funding to a rate of about $30 million per year and fulfills our international commitments at this time. We must make a decision by fiscal year 1998 on the program's future direction.

Two U.S. companies, Lockheed Martin and a joint venture between Hughes Aircraft and Raytheon, have joined with their European counterparts (Daimler-Benz Aerospace, and Siemans from Germany; Aerospatiale and Thompson from France; and Aienia from Italy) to form two international teams that will execute the PDV phase of the program. A single international team will be chosen to pursue Design and Development (EMD in the U.S.), with an in-service date scheduled for about 2005.

Joint TMD Program Element. Joint TMD activities represent programs ad tasks that are vital to the execution of joint BMD programs. These activities have been grouped together because they provide direct support across BMD acquisition programs which could not be executed without this important support. Therefore, we introduce greater efficiency into the programs because they accomplish an effort once which otherwise would have to be separately accomplished for each Service element. These activities include architecture development and battle management, command, control, communications, and intelligence; test and evaluation support, including the development and fabrication of targets; threat analysis and support;

model and simulation support; lethality and phenomenology studies and analysis; and direct interface with the warfighter. Unfortunately, we did not adequately explain the importance of this key program element last year and sustained a significant and painful reduction to its budget. This significantly reduced our ability to support the core TMD acquisition programs. In some instances, critical target development and lethality analysis had to be funded by the core programs themselves. These unexpected expenditures contributed to some of the executability issues identified by the BMD Program Review.

Therefore, I would like to outline just a few critical activities that are funded in the Joint TMD account. Interoperability in BMC^{3}I is essential for joint TMD operations. Accordingly, BMDO takes an aggressive lead to establish a architecture that all the Services can build upon and is actively pursuing three thrusts to ensure an effective and joint BMC^{3}I for TMD. The three thrusts are: improving early warning and dissemination, ensuring communications interoperability, and upgrading command and control centers for TMD functions. The primary goal is to provide the warfighter with an integrated TMD capability by building-in the interoperability and flexibility to satisfy a wide range of threats and scenarios. From its joint perspective, BMDO oversees the various independent weapon systems developments and provides guidance, standards, equipment and system integration and analysis to integrate the multitude of sensors, interceptors, and tactical command centers into a joint theater-wide TMD architecture. While this may not seem to be as exciting as building improved TMD interceptors, it is absolutely critical to the success of the U.S. TMD system. It is the glue that holds the architecture together and will ensure that the whole is greater than the sum of its parts.

In addition to BMC^{3}I, the other activities in this program element strongly support the TMD system and key acquisition programs. For example, BMDO test and evaluation responsibilities include oversight of major defense acquisition program (MDAP) testing, sponsoring and conducting TMD family of systems integration and interoperability tests, development of common targets, ad providing for rage and ground tests. My organization sponsors and conducts system integration tests to ensure inter- and intra-Service operability and interoperability of the TMD family of systems with external systems. In addition, this program element funds a critical series of interactions with the warfighting CINCs. The CINC's TMD Assessment program consists of operational exercises, wargames, and Warfare Analysis Laboratory Exercises (WALEX). Our WALEX programs, for instance, allow senior military leadership insights into TMD operational planning and employment. The CINC TMD Assessments program enhances two-way communication between BMDO as the developer and the warfighting CINCs who are the users of TMD systems. These exercises allow the CINCs to assess their TMD capabilities and shortfalls so they may refine and articulate their TMD requirements, and improve their current and future TMD operational capabilities. The program facilitates the development and refinement of TMD doctrine and concepts of operations as part of the CINC's and Joint Staffs overall theater operations plans. We need to fully fund this important program element if we are to deliver on our promise of improved TMD systems to the warfighter.

U.S.—Israel Arrow Program. Israel has been involved in U.S. missile defense programs since 1987, when both countries signed a Memorandum of Understanding on BMD participation. Israel's participation includes architecture studies, technology development and experiments, examination of boost-phase intercept concepts, and the development of the Arrow interceptor missile. As the Secretary of Defense has noted recently, the Arrow program advances our shared objective of working together to develop effective ways to counter the threat posed by ballistic missiles in the Middle East and elsewhere. An agreement with the Israeli Ministry of Defense to continue involvement in the development of the Arrow weapon system will be ready for signature between both our countries in the near future. The Arrow Deployability Program, as it is called, involves a total commitment of $500 million over the next 5 years, with $300 million contributed by Israel and $200 million from the United States. This will allow for the integration of the jointly developed Arrow interceptor with the Israeli developed fire control radar, launch control center and battle management center. I am particularly pleased to report that on February 20th, the Arrow II missile completed its second successful flight test, which will lead soon to the intercept of a target tactical ballistic missile.

System integration efforts will lead to a UOES-like Arrow system projected for fielding in fiscal year 1998. The U.S. continues to derive valuable data and experience through our participation in the Arrow program. In particular, we are gaining important experience in establishing interoperability with U.S. TMD systems and the Arrow weapon system. The agreement we have on participation in the Arrow program will be revisited in 3 years to evaluate the synergies between Arrow and

U.S. TMD programs and to ensure that worthwhile benefits continue to flow to the U.S. programs. It is important to note that this cooperative program is also funded within the Joint TMD program element.

Cruise Missile Defense. Many TMD sensors, BMC^3, and weapons also have an effective capability to counter the growing land-attack cruise missile threat. In particular, the lower-tier PAC–3, Navy Area Defense, and MEADS systems operate in the same battlespace and will have significant capability against the cruise missile threat. In addition, the NMD BMC3 architecture will be designed to promote interoperability and evolution to a common BMC^3 system for ballistic and cruise missile defense.

The Department also has a number of initiatives outside the BMD program to improve the ability of U.S. forces to detect and defeat cruise missiles "in theater" or launched against the United States. These initiatives include advanced technology sensors to detect low observable cruise missiles; upgrades to existing airborne platforms to improve beyond the horizon detection capability against cruise missiles; and upgrades to existing missile interceptor systems.

National Missile Defense. The Department's NMD goal is to position the U.S. to effectively respond to a strategic ballistic missile threat, as it emerges. Based upon the Program Review, the NMD effort has been shifted from a technology readiness to a deployment readiness program. Following the 1993 Bottom Up Review, the NMD program focused on maturing the most challenging technical elements—often called the "long poles" of the NMD system. The Department is sensitive to Congressional interest in a shift to a more system-oriented approach which would provide for the balanced development of all elements necessary for the initial deployment. We are focusing our efforts on a program that is referred to as "3 plus 3"—a 3 year development and planning phase which, if necessary, could be followed by a 3 year system acquisition and deployment phase.

The Department is committed to the development phase—or the first "3" years—of this 3 plus 3 program. During this period BMDO and the Services will develop and begin testing the elements of an initial NMD system. If, at the end of those 3 years of NMD development efforts, the ballistic missile threat to the United States warrants the deployment of an NMD system, then in another 3 years that system could be deployed. Based on this program an initial operational capability could be achieved in approximately 6 years, by the year 2003.

If, on the other hand, we reach 1999 and the threat does not warrant deployment of an NMD system, the Department's 3 plus 3 program is designed to preserve the capability to deploy an NMD system within 3 years by continuing development of the system elements and conducting a series of integrated tests. Over time, these efforts would allow us to enhance both the technology base and the demonstrated systems performance. Therefore, we can make a more informed deployment decision and, when the threat materializes, be in a position to deploy a more capable NMD system. The system capability would grow through three avenues: incorporating advanced technology, increasing element performance and adding additional elements. We would continue to improve system effectiveness by incorporating advanced technologies as they mature in our technology base program. As we continue to test we will identify and incorporate improved components to the system elements, such as improving the kill vehicle, enhancing its lethality, or refining the system software. When appropriate, we will add additional elements to the defense. For example, the Space & Missile Tracking System (SMTS), which is being developed separately by the U.S. Air Force, would be integrated into our proposed architecture as soon as it was available to enhance overall NMD performance. As I testified last year, the SMTS system provides a vital role for both NMD and TMD systems. The low earth orbit SMTS is an integral part of a potential deployment of an objective NMD system. While we are enhancing the NMD system's capability we will address production and deployment lead-time issues to reduce the time required to field the system when a deployment decision is made.

Funding for NMD has been shifted forward in the FYDP with allocations of about an additional $100 million per year in fiscal years 1997 and 1998. This increase, coupled with the additional funds provided by Congress for NMD in fiscal year 1996, will allow us to complete a reasonable, albeit high-risk, development program leading to the demonstration of the NMD system in an Integrated System Test in 1999.

The NMD system we will demonstrate in 1999 includes four fundamental building blocks used by all of the proposed NMD architectures: the interceptor; ground-based radar; upgraded early warning sensors; and battle management, command, control and communications (BM/C^3). Depending on the threat to which we are responding when a deployment is required, these elements could be combined in a treaty compliant deployment or some other architecture.

The Ground Based Interceptor is the weapon element of NMD. It consists of an exoatmospheric kill vehicle (EKV) launched by a fixed, land-based booster. We have made significant progress over the past few years to develop an EKV which can perform hit-to-kill intercepts of strategic reentry vehicles in the midcourse phase of their trajectory. Rockwell and Hughes are under contract to develop and test competing EKV designs which will be evaluated in a series of flights starting later this year. Following intercept flights in 1998, a single contractor will be selected for the initial system. The EKV flights, which start this year, will be conducted using the Payload Launch Vehicle as a surrogate for a dedicated booster. Several options are being examined for the GBI booster, including Minuteman III, and other modified, off the-shelf, boosters.

The NMD Ground-based radar is an X-band, phased array radar that leverages heavily off developments achieved by the THAAD GBR program. By taking advantage of the work already completed in the TMD arena, BMDO has been able to reduce the expected development cost of the GBR by approximately $70 million. In 1998 the GBR prototype, developed by Raytheon, will be fabricated at the U.S. Kwajalein Atoll to begin testing to resolve critical issues related to discrimination, target object map, kill assessment, and electromechanical scan.

The Upgraded Early Warning Radar (UEWR) program is designed to answer fundamental questions concerning how UEWRs can contribute to National Missile Defense while completing the initial development. We have already completed 2 years of successful demonstrations, showing how software modifications can increase the radars' detection range, sensitivity, and accuracy. Our plan is to award a contract in early 1997 for the design and test of a software demonstrator. This tool will be used to prepare specifications for the early warning radars upgrades necessary if there is a decision to deploy an NMD system before SMTS is available.

The National Missile Defense Battle Management, Command, Control, and Communications (BMC^3) program provides the capability for the designated operational Commander to plan, coordinate, direct, and control NMD weapons and sensors. The NMD BMC^3 development program uses an open system architecture and the best industry practices for development of software that will have the capability to support NMD integrated ground and flight tests. The BMC^3 product, which will include cruise missile defense consideration, leverages off previous NMD developments and the BMC^3 systems being developed for the TMD program.

Over the FYDP, the Department has budgeted those funds required for a deployment readiness effort, or roughly $2.8 billion. Deployment of an initial system would cost approximately $5 billion more. Our analysis shows that such a deployment would provide an effective defense against first generation rogue ballistic missile threats to the U.S. The intrinsic strength of our concept for an initial deployment is that the architecture has been specifically designed for evolutionary development of a more robust and effective NMD system over time; it can grow to counter an increasingly sophisticated threat, if required.

As I mentioned earlier, one of the significant enhancements to the NMD system will occur when the SMTS becomes available. This system, funded and developed as part of the Spacebased Infrared System (SBIRS) program, provides 360 degree over the horizon sensing throughout the threat trajectory which greatly increases the system performance against all of the potential threats.

The NMD development program we are planning will continue to comply with all treaty obligations. As the 3 plus 3 NMD program progresses, we will study many different technologies and architectures. We will review these options from every perspective including cost, operational effectiveness, and existing treaty obligations.

Potential Early Deployment Options. The 3 plus 3 concept I have described for NMD has its 'genesis in last year's efforts by the BMDO Tiger Team, which investigated how we could accelerate the development and deployment of an NMD system to respond to more rapidly emerging threats to the United States. The Tiger Team, estimating time scales of approximately 4 years to deployment, described several opportunities and the associated challenges to deploy an interim NMD capability to deal with rudimentary Third World threats to U.S. territory. In this regard, the BMDO Tiger Team was an important and valuable endeavor. Nonetheless, it is important to note that the opportunities they described are "off ramps" from efforts to develop and deploy an objective and highly capable NMD system, and if not carefully evaluated, could become technological "cul de sacs." Simply put, near-term options might not field an initial system that could be evolved to a more effective defense. The tradeoff we must consider is between earlier deployment of a less capable system, or later deployments of increasingly effective defenses for the U.S. homeland. Our 3 plus 3 approach is designed to provide an early deployment opportunity which can evolve robustly with the threat and operational needs. As I mentioned earlier, and as a by-product of the Tiger Team exercise, both the Air Force and

Army provided their recommendations on how to develop and deploy an NMD system. The Air Force and Army, in particular, have proposed alternatives which are very similar to, and with immediate commitment to deployment could allow earlier maturation than, the Department's 3 plus 3 program. In either case, a minimum of approximately 4 years to a capability was estimated. Consideration of such alternatives to the 3 plus 3 program has strengthened the commitment to deployment readiness within the Department. When it literally could come down to the effective defense of the nation against an accidental, unauthorized or limited ballistic missile attack, it is critical for us to fully assess all the options before us. The Army, Navy and Air Force remain critical members of our team and are vigorously and efficiently developing those portions of our 3 plus 3 architecture to which they are assigned.

The Army and Air Force proposals are very similar to BMDO's plans in that they use the same fundamental building blocks: ground-based interceptors, ground-based radars, upgraded early warning radars, and BM/C^3. The differences come in the specific design of these elements and the way they are eventually combined architecturally. The Air Force's proposal is based on the belief that significant benefits can be achieved by leveraging off the deployed Minuteman III infrastructure. They propose using the Minuteman III booster to launch the kill vehicle, which could be either the EKV already described or a somewhat simpler kill vehicle which could be developed by the Air Force. The Minuteman III concept would allow the use of existing launch silos and some of the existing BM/C^3 network, potentially reducing the total cost. To provide the necessary sensor data, the Air Force proposes to augment the coverage provided by Upgraded Early Warning Radars.

The Army suggests a commercial booster developed by combining existing "off-the-shelf" booster stages to launch the EKV. These interceptors would be deployed in the existing silos of the old Safeguard complex near Grand Forks, North Dakota. In order to enhance radar coverage, the Army proposes also to augment early warning radars and recommends using technology from the GBR.

Each of these architectures has merit, but they also have potential shortcomings. Early deployment options are capable of defending against only the most simple ballistic missile threats—that is a few warheads atop first generation ICBMs. BMDO and CINCSPACE are engaged in the assessment of the existing and future threats, as defined in the National Intelligence Estimate and the NMD Threat Assessment Report. The joint endeavor with CINCSPACE includes an aggressive effort to specify the operational requirements, including effectiveness and coverage, and evaluate them against architectural options and system level developmental requirements. Two major efforts for this evaluation include active Command and Control simulations, which combine architectural options, specific threats, and concepts of operations in a simulated real-world environment; and a cooperative effort in the development of the Battle Management and Command, Control and Communications (BMC^3) element. The NMD architecture will be specifically tailored to meet the current and emerging threats.

In addition to such operational concerns, alternative architectures still need to be reviewed from the perspective of our treaty obligations. For instance, the proposals call for the use of additional early warning radars. One alternative also would use existing Minuteman III assets (including silos) as the boosters for the NMD kill vehicles. This raises both ABM and START Treaty issues.

I think it is important for the Congress to be aware of these and other potential architectures, including both operational concepts and arms control impacts when considering these alternative architectures. While I acknowledge that there are potential limitations, I still believe there is strong merit to considering them.

If we identify an emerging ballistic missile threat to the United States, I would like to have the best possible deployment options available to the President and Congress. I want to reiterate, when we address the defense of the American People against even a rudimentary Third World ballistic missile threat, I want to make sure we have every feasible opportunity to effectively defeat that threat as soon as possible.

I strongly endorse staying the course with the Department's current NMD strategy, while continuing to protect our earlier deployment options. I think it is the prudent course of action. Following 3 more years of system development, we will reach the point where a low risk decision could be made to deploy an NMD system, if the threat warrants. If not, we will be prepared to continue development of a system that could still be deployed quickly in response to a threat but would ensure a more effective defensive system. The 3 plus 3 program is designed with the flexibility to allow it to be accelerated if the threat warrants and additional resources are applied. As it is currently structured it provides the capability to deploy with an IOC in 2003, the date Congress desired. At this time the specific deployment architecture is not an issue which must be decided. What is needed is program stability. Completing definition of a system of this complexity in 3 years is a challenge—we cannot afford to keep starting over to develop something new. I urge you to accept our program and to provide sufficient resources to complete the deployment readiness phase of the 3 plus 3 program. Then, if it is necessary, we will be prepared to defend all of America against limited missile attacks by 2003.

BMD Technology Program. As we move forward with our acquisition programs, the programmatic demands on our BMD resources have continued and the number of congressional earmarks has risen. I am concerned that because of this we have been forced to reduce our technology program. I would like to remind the Committee that today's acquisition programs are possible only because significant past investments in BMD technology made them possible. For instance, development of the "hit-to-kill" interceptor technology, now adopted by PAC–3 and THAAD, evolved from the SDIO's Flexible Lightweight Agile Guidance Experiment (FLAGE) technology demonstration program in the mid-1980's. Technologies making the infrared sensors and data processors possible for the upcoming SMTS satellite system have been developed over the past decade through BMDO-sponsored research and development. That includes infrared detectors, cryogenic coolers, optical hardware and radiation-hardened microelectronics.

Just as these past technology investments helped enable current TMD acquisition programs, today's technology investments will prepare us for evolving, proliferating threats. Evolving threats, based on reasonable extrapolations of credible countermeasures, set the pace and direction of today's advanced technology program. As a result, next generation TMD and NMD systems will be able to draw from a set of readily available technology solutions.

We have organized the technology program to balance across several variables, including TMD and NMD applications, and technology development and demonstrations. In this regard, we have identified the most critical technology requirements for the program and are pursuing them within the constraints of the funding available for the technology program. These unique technology requirements include:

- sensor and seeker component programs to improve the range and resolution of missile defense sensor systems and interceptor seekers;
- interceptor component programs to develop faster, smarter, more capable interceptors;
- BMC^3 high-data and low-error advanced component technologies needed in automated decision aids, data fusion, adaptive defense operations, and secure communications;
- phenomenological research to determine how the threat, environment and defensive systems will behave and interact during an engagement; and
- research into advanced concepts, such as directed energy systems, that are capable of global coverage (i.e., accomplishing both national and multiple-theater missile defense missions), and that can engage targets in the boost-phase.

I believe that proper development of technologies to meet these critical requirements is essential to maintaining our program's technological edge. Nowhere else in the Department are the basic or component BMD technology programs funded. Therefore, to ensure the continued flow of new solutions to meet evolving ballistic missile defense requirements and technology needs, I encourage the Congress to consider the BMD advanced technology program as a strategic investment. I will make sure the technology program maintains a clear focus and that its products remain relevant to the BMD mission and are of high quality. I believe this investment is critical to the continued success and viability of our BMD program.

Conclusion. The BMD program today is a focused, prudent response to the real world. We are aggressively working to meet existing and emerging ballistic missile threats, first to our forces overseas, as well as our friends and allies; and second, the emerging missile threat to the United States.

I am dedicated to ensuring that we field improved TMD systems as soon as possible to provide real protection for our men and women as they go into battle to defend our national security interests. I believe we have' made strong progress in developing and acquiring these improved systems. I am particularly proud that the lower-tier TMD systems will very soon be in the hands of the warfighter. We have made this progress because of the strong and enduring Executive-Legislative consensus on Theater Missile Defenses. This consensus is directly responsible for ensuring consistent program direction and the stable allocation of resources to get the job done. This support must continue if we are to deliver on our collective promise to give the warfighter the protection he needs in a world with proliferating missile threats.

As I have testified today, the Department has structured a deployment readiness program for NMD that is prudent and flexible. That program acknowledges that some potentially adversarial nations are interested in developing longer range ballistic missiles which could strike the United States. The 3 plus 3 program could deploy an effective nationwide NMD system against a first generation Third World threat by the year 2003. However, if that threat develops sooner, we have options which could deploy an emergency NMD system at an earlier date. Given the uncertainty of the ballistic missile threat to the United States, it is prudent for the Department to proceed with the 3 plus 3 program. However, I think it is critical that we work closely together on a bipartisan basis to form the consensus for NMD that the TMD program has long enjoyed. Such a course is required if we are to succeed in maintaining program stability and coherence. The success of NMD depends on our ability to reach this consensus.

On a more personal note, as many of you are aware, I have announced my intention to retire. Therefore, I would like to express my deep appreciation for the wonderful working relationship I have enjoyed with the Members and staff of this committee. For two reasons I have persisted in my plans to retire this year. First, for the first time in 33 years, my family has asked that I slow down just a bit. Lastly, I truly feel that this is a propitious time for the program to make a leadership change. There is now as much detailed understanding of the missile defense program on this side of the river as there is on the other. The administration is committed to missile defense, with the only major disagreement with Congress in terms of how much and how soon, rather than missile defense, yes or no. Of course, there is much more to be done and we will need your help to make missile defense a reality. I hope the future Director of BMDO has the opportunity to work closely with you, Mr. Chairman, Senator Exon and all the Members of this committee. That experience has been a great honor and privilege for me. Last, I want to express my deep gratitude to the committee's professional staff, in particular Mr. Eric Thoemmes and Mr. Bill Hoehn, for their tireless efforts on behalf of the program.

Thank you, Mr. Chairman. I look forward to continuing to work with the committee, as well as the entire Congress, to make highly effective and affordable missile defenses a reality. Mr. Chairman that completes my statement. I look forward to addressing the Committee's questions.

Senator LOTT. Thank you very much, General O'Neill.

Senator Bryan, would you like to make an opening statement?

Senator BRYAN. Mr. Chairman, I will forego that.

Senator LOTT. Senator Smith, would you have an opening statement?

Senator SMITH. I will follow my leader, Senator Bryan.

Senator LOTT. I will go ahead and begin the questions, then, and allow you an opportunity here in just a few minutes. I do have a number of questions, so I will ask a few of them, and then I will come back for a second round.

General O'Neill, could you describe the role that you played the role that you played in the recent BMD program update review?

General O'NEILL. Yes, sir, I would be happy to. The program review was conducted independent of BMDO. It was felt because of our advocacy position that it would be better for a set of people from the services, and the Office of the Secretary of Defense, who had various functional responsibilities, to independently assess the program and where the program should go.

We provided briefings to the group. We provided major elements of input to the group, estimates of costs, various alternatives for program strategies, and the program review reported their findings to Dr. George Schneider, who works for Dr. Kaminski.

Dr. Kaminski called me in at that time, and I had the opportunity after the program review had provided their input to add my comments about the review process, the levels of funding for various programs, and I would just like to say that Dr. Kaminski was very responsive—Dr. Kaminski was very responsive—to the suggestions I made to change certain conclusions and recommendations that came out of the program review.

The most difficult issue, of course, for me to comment upon was the ceiling, the top line for the program. I made everyone as sensitive as I thought I could make them to the clear intention of Congress to increase the resourcing of the program. However, I think the consensus decision and the consensus point of view in the Pentagon was that there are priorities supported by Congress across the whole spectrum of DOD, and we have to weigh the priority of missile defense with things like recapitalizing the Army, the Navy, and the Air Force. Also, that was the one place where I was unable to push, and that was the ceiling for the program.

Senator LOTT. Well, let me pursue that last point just a little bit more. When you appeared before the Armed Services Committee with Dr. Kaminski earlier in March, you expressed your support for the program that he presented. Now, did you mean that you support the program assuming that you have to live with a flat annual budget of $2.8 billion, or did you mean that you believe that $2.8 billion per year is enough to do all the things that we should be doing?

General O'NEILL. Sir, what I supported was at a ceiling of $2.8 billion. I felt the program review, with slight changes that we made, Dr. Kaminski and myself and Dr. Schneider, is just about the best way to spend the $2.8 billion.

Senator LOTT. I see. Under Secretary Hamre's budget briefing said that part of DOD's weapons modernization strategy is to, quote, strengthen NMD and TMD programs. But DOD's recent BMD program update review appears to be inconsistent with that assertion, especially regarding the upper tier TMD program. How do you respond to that?

General O'NEILL. Sir, I think whenever a program is reviewed on the basis of first principles, and I think it was reviewed fairly by the external experts who looked at it. They find ways to help the program, and I think what Mr. Hamre probably meant was the fact that doing another—basically bottom-up review of the program is a healthy way, and forcing me to get up and justify how much money I need to execute various parts of my program. If I cannot do that, and convincingly do it, then there may be some weakness, and I think that is what Mr. Hamre means.

We took a very detailed look at every part of the ballistic missile defense program, and again, within the ceiling that was allocated for missile defense, I think the reviewers did an excellent job. I made some changes. I recommended to Dr. Kaminiski some changes. But overall, I think their grade was a B plus in terms of within that constraint. We did not try to look at significantly larger excursions for higher level funded programs.

Senator LOTT. In your opinion, General, just how valuable is BMD, both theater and national, as a foreign policy tool to help us deal with intimidation, inhibit escalation, and deter the spread and use of weapons of mass destruction?

General O'NEILL. Well, sir, the BMD program is only as much value as it is perceived to have credibility in the eye of the rest of the beholders of the program. If we have a program like the one we have today where the administration is committed to TMD and committed to deployment of national defense when a threat arises, that would certainly get my attention were I a potential developer or fielder of either tactical ballistic missiles or strategic ballistic missiles. So I think as long as we are perceived as being credibly committed to a BMD program in America, we stand to affect things like deterrence, intimidation, in a positive way.

Senator LOTT. I know it has not been that long that the 1996 authorization has been in law, but we did call in that legislation for a number of reports that we really need as we look to the future. I think Senator Nunn was interested in a couple of them in particular. But we need the reports on the Corps SAM, the boost phase intercept, the Navy upper tier, and the space-based laser. What is the status of those reports? Before you answer that, I want to urge you to move forward with them aggressively because we are going to need them if we move toward making decisions for the next year's authorization.

General O'NEILL. Sir, let me say first that all the reports that you have mentioned are right now in my office going through the final levels of staffing. So I cannot blame anybody for the fact that those reports are not yet on Capitol Hill. What I can tell the committee is that as late as this morning I was told that all those reports will be out for staffing in the Pentagon for comment tomorrow. I am hoping that that is a fact. The staffing will take several weeks, I am sure, and then hopefully they will be in Congress.

Senator LOTT. Senator Nunn has arrived.

Senator, would you like to make an opening statement today, and go ahead and ask questions, if you are ready to go, or we could go to the other Senators.

Senator NUNN. Why do we not give the other Senators a chance, and then I will come back? Let me just welcome General O'Neill. I understand—I just learned that you have announced your retirement. When is that going to be?

General O'NEILL. Sir, the retirement parade is the 31st of May.

Senator NUNN. 31st of May?

General O'NEILL. Yes, sir.

Senator NUNN. Well, you have served as Director of the Ballistic Missile Defense Organization, I think, with considerable distinction, with a lot of grace under fire, and with the confidence of this committee and I think the Congress, and I am sure that from time to time the Congress has compounded your challenges with our debate, but we will miss your wise counsel and advice, and I know it is going to be a tough job finding your replacement.

Mr. Chairman, we all know what a contentious issue the ballistic missile defense proved to be during the conference last year and on the floor of the Senate before that. With the accelerated schedule before us this year and with all the compressed time frame, I hope we can find a bipartisan approach. I know Senator Dole and Congressman Gingrich have introduced a Ballistic Missile Act that is similar to the one that was very controversial last year, but I hope for the sake of getting an authorization bill passed we will all strive to try to find a way to work together to make good sense out of this program for the American people, both in the short term and the long term.

I think that is our challenge this year. Otherwise we could end up with no BMD authorization and perhaps not even an authorization bill itself because of the controversy of this issue. So I look forward to asking questions, but I will wait until my turn.

Senator LOTT. Senator Bryan.

Senator BRYAN. Thank you very much, Mr. Chairman. Let me join Senator Nunn in congratulating the General on the distinguished service that you have entered to the Army and to this country. We greatly appreciate it and wish you well as you move into a new phase of your career.

General O'NEILL. Thank you, sir.

Senator BRYAN. General, as I understand it our NMD policy is that for the next 3 years we continue to pursue the development of a missile system, and at the end of 3 years we in effect do an evaluation of where we are and make a determination at the end of 3 years as to whether to actually go into a deployment mode. Am I correct on that?

General O'NEILL. Yes, sir.

Senator BRYAN. Presumably, if the threat assessment at the end of 3 years was that deployment was not mandated then we continue to move forward with the development process and maybe are able to develop an even more sophisticated system?

General O'NEILL. Yes, sir.

Senator BRYAN. Always with the view that we do a critical reassessment as to whether or not deployment is necessary?

General O'NEILL. Yes, sir.

Senator BRYAN. In your testimony today I understand that you are supportive of that policy?

General O'NEILL. Yes, sir. I think it is an excellent strategy.

Senator BRYAN. May I take it that you would not favor legislation in the Congress at this point to mandate the deployment of an NMD system by any arbitrary date, whether it is 2003, 2004, or 2005?

General O'NEILL. Sir, I think that is Congress' decision. I think the strategy you have right now is a strategy that responds to a certain level of uncertainty about what we would be deploying against, what would the threat be. So I think the strategy right now is a very prudent strategy in that regard.

Senator BRYAN. Let me approach it a different way. As you are about ready to listen to your swan song here and to walk off the stage, you are not recommending to this committee or to this Congress that we change our policy?

General O'NEILL. No, sir.

Senator BRYAN. Let us take a look in 3 years, continue our development, see where we are, and make a judgement based upon that time, and not try to look at the crystal ball now to see what the situation may be 3 years from now.

General O'NEILL. Yes, sir.

Senator BRYAN. Mr. Chairman, those are the only questions I have. Thank you.

Senator LOTT. Senator Smith.

Senator SMITH. Thank you very much, Mr. Chairman.

General, let me repeat, the best of luck to you.

General O'NEILL. Thank you, sir.

Senator SMITH. General, is there any nation in the world today that you would consider to be an unfriendly nation who could reach us with a ballistic missile?

General O'NEILL. Sir, I would suspect that one has to consider potential capabilities of at least former adversaries. I would think China and Russia come to mind as nations for which we need to be prepared if their political situation demanded that they take up arms against us.

Senator SMITH. So, when a threat arises, you are defining threat as intent, not capability. Is that correct?

General O'NEILL. Yes, sir. Also, there are some other potentially adversary nations that are developing this capability that we need to pay attention to. One that comes to mind is North Korea, about which I am greatly concerned.

Senator SMITH. But not concerned enough to pick a specific date for the deployment of a national missile defense system?

General O'NEILL. Sir, I think the person to ask that question is the war-fighter for whom I work, General Joe Ashey, who is the CINCSPACE and would be the Commander of NORAD, and he would be responsible for giving me a date. I have to have a capability by a certain date. I think if you look at the NIE you can make arguments pro and con the decision that you are concerned about, and what I would recommend is we look at the NIE, and based upon the NIE ask the war-fighter when he has to have a response to that emerging threat.

Senator SMITH. Well, a couple of years ago or so General Powell said I do not know the intent of the enemy, but I do know the capabilities. Would he agree with you that we should not have a specific date?

General O'NEILL. Sir, I cannot speak for General Powell. What I can say is as a developer I need to know against what I am asked to defend, and as you know, we have recently talked about accidental, unauthorized, or a third country kind of an attack. We have not talked about defending against the Russian strategic force. It is my opinion that we could have a defense against those three that I just mentioned—accidental, unauthorized, and third country—and not threaten the deterrence relationship that exists between us and Russia, just because of the simple numbers involved.

Senator SMITH. In the hearing that Senator Nunn had the other day in the Government Affairs Committee, a couple of his staffers who have traveled in what was formerly the southern part of the Soviet Union, discussed some of the technology that is being transferred there and the brain-drain that is taking place. If you take away the question of intent for a moment, it is clear that so-called rogue nations or terrorist nations are at least seeking, if they do not already have, the technology to deploy some type of a missile, whether it be theater or ballistic, against us.

Given this knowledge, why would we want to wait 3 to 5 years before deploying or preparing, to deploy a national missile defense system?

General O'NEILL. I think what it does, what taking a little bit more time does, is it gives you the flexibility to understand better what you have in your quiver, and understanding better what may be facing you out there on the other side. The time line that we are talking about is a relatively short time line when you compare it with the NIE that talks about 15 years. The NIE says no threat to the contiguous 48 for 15 years. The biggest concern I had with the NIE was uncertainty. But a lot of that uncertainty goes away when somebody tells me I could have a defense in 6 years. Six years is a lot shorter time frame than 15, so I am a lot more comfortable with my 3 plus 3 as my insurance policy in case the NIE is wrong.

Senator SMITH. Well, as you read about the theater missile defense architecture in section 234 of the 1996 defense authorization bill, is it your opinion that the administration budget complies with the requirement set in that law?

General O'NEILL. No, sir. I think we are short. I was asked that question by the HNSC, the House National Security Committee, and I said I would provide for the record, and we are working it right now in the Pentagon, what it would cost and what functions we would perform if we were to execute the letter of the authorization bill, and we will provide that for you, sir, so you will see what that would cost.

Senator LOTT. We would like to have that provided for the record, if we could.

[The information referred to follows:]

The Theater Missile Defense (TMD) component of the ballistic missile defense program cannot meet the dates specified in Section 234 of Public Law 104–106. PAC–3 and Navy Area Defense are proceeding as quickly as the acquisition process will allow, with PAC–3 Initial Operational Capability (IOC) and Navy Area Defense User Operational Evaluation System (UOES) estimated for fiscal years 1999 and 2000, respectively. Because of fact-of-life technical difficulties and schedule risks, the dates specified in public law are not achievable for these two programs.

With respect to upper tier programs, the fiscal year 1996 Defense Authorization Act called for the Department to establish a fiscal year 2000 First Unit Equipped (FUE) for THAAD. This date is no longer technically feasible. Similarly, the Department estimates that for Navy Theater Wide, a UOES deployment date of fiscal year 1999 and FUE of 2001 cannot be achieved.

General O'NEILL. We are working on it right now. We are probably half-way through it, and you will see the fiscal challenge and the time challenge that would be required.

Senator SMITH. Well, Mr. Chairman, my time has about expired. I just want to point out, General, that the question of whether the law was being complied with or should be couplied with was a matter of considerable controversy in the committee hearing with Dr. Kaminski. I think many of us feel that if we are writing a law, it ought to be complied with or we should be given some reasonable explanation why it is not.

Now, you indicate that you feel that it is not being complied with. Is this noncompliance with section 234 in any way a hinderance or threat to our national security?

General O'NEILL. Sir, I cannot say about the exigencies of the threat. I think we need capability in TMD as soon as possible. I think the upper tier programs are vital. I was disappointed that the priorities that were established did not allow us to move as swiftly on the upper tier systems as we had hoped. I think we need a robust 3 plus 3 program for national missile defense, and I think within that spectrum of needs I think we are responding to the threat, and I think we are doing what we can afford to do based upon the priorities of the Pentagon.

Senator SMITH. But, the threat has not diminished since 1996, has it?

General O'NEILL. No, sir. It has gotten worse.

Senator LOTT. Senator Nunn.

Senator NUNN. Thank you, Mr. Chairman.

General O'Neill, how important is it from the point of view of our ability to defend against limited accidental or unauthorized missile attacks that START II enter into force and be implemented on the Russian side?

General O'NEILL. Sir, I think START II certainly needs to be implemented. All of us support reducing the threat, so I think it is a vital part of our national strategy to have these treaties. I think if you look at what an Accidental Launch Performance System (ALPS) could provide, let us say a treaty-compliant system with 100 interceptors, I find it impossible to understand how someone would suggest that that could threaten START II when the START II limits are above 3000 RV's and a treaty-compliant defense can protect against 100 or fewer, probably fewer than 100. I see the difference between those capabilities so far, so significant, that I see no reason why we cannot have both, why we cannot have an ALPS and at the same time have START II, and it boggles my mind that somebody would tie those together.

Senator NUNN. I would agree with you on that.

Does the threat change in terms of accidental or unauthorized launch if the numbers come down? If we did not get down to the 3000 level, in other words if START II was not implemented, the Russians do not ratify it, if they refuse to go along at some point for any reason, does that affect the accidental and unauthorized threat or our ability to defend against it?

General O'NEILL. Sir, I think it could. It could. That is an interesting question. I had never thought about it. But just the fact that there are more of them in more people's hands would lead one to believe that there is more chance that someone is going to have too much vodka and do something he should not do—or she should not do.

Senator NUNN. So your position is we need to have an ability to have a defense against an attack as well as get reductions on the Russian side?

General O'NEILL. Yes, sir. I think that would be the perfect way to start.

Senator NUNN. Therefore, the two things are not in any way conflicting, because certainly a treaty-compliant system does not threaten deterrence when you have 3000 warheads.

General O'NEILL. Exactly.

Senator NUNN. General O'Neill, suppose that at the end of the 3-year national missile defense development cycle we decide not to deploy the NMD system you have developed, for whatever reason, money, effectiveness, whatever, there is the decision either by the Congress or the President or both not to deploy. At that stage I assume you would start another development cycle for national missile defense aimed at both probably lowering the cost and greater effectiveness, if those two things had been a problem. How long would that second NMD development cycle last, and would it be key to the maturation of other systems in developments such as Space and Missile Tracking System (SMTS)?

General O'NEILL. Yes, sir. I think one could say, the way we have the evolutionary program put together that first 3 years, you could almost make a decision every year to deploy, because things are going to be getting—after that first 3 years, things are going to be getting better every year. You will get a better discrimination capability on an interceptor. You will have improved software capability.

But I think the first big quantum leap in capability would come when you have the space-based SMTS satellite that can give you over the horizon queuing.

Senator NUNN. That would come about what year, beyond the third?

General O'NEILL. Sir, right now it is projected that would come in the time frame 2006, but the Congress has asked us to move that forward as early as 2003—2003.

So, we are looking at 2003 right now. That is an Air Force program, and if we had additional resources, we could have SMTS earlier.

Senator NUNN. What other systems that could augment the capabilities of the initial 3-year development system, NMD system, are there under development, and when are they scheduled to be ready, and by that I mean quantum jump-type capabilities?

General O'NEILL. Sir, the only real quantum jump capability that comes to mind in that year term is the SMTS. The next real quantum jump in capability, I would suggest, is space-based laser, the space-based laser program could mature, oh, probably within about 5 years of that first deployment.

Senator NUNN. Let me strike the word quantum out of my question and say, significant improvements. Would that change your answer?

General O'NEILL. Significant? Sir, I think I will have to provide that for the record, but the large ones that really come to mind are SMTS, space-based, sensing, and then space-based laser, which would be a weapon based in space that would credibly conduct defensive activities in the boost phase, and I think that is a major leap.

There are some other components, better discriminators, an endo capability—we have an advanced interceptor technology which could allow our ground-based interceptor to do low-altitude engagements, and that could give us more time, more battle space.

Senator NUNN. Would these changes be primarily evolutionary changes, except SMTS?

General O'NEILL. Yes, sir.

Senator NUNN. Would there be any significant cost difference, let us say if you waited until year 5 rather than year 3?

General O'NEILL. No, sir.

Senator NUNN. General O'Neill, suppose we were to deploy a 3–D compliance system at Grand Forks along the lines of your three-plus-three proposal, then suppose we and Russia were to agree to remove the 1974 protocol from the treaty allowing us to have two sites, which was the original treaty, would the first site at Grand Forks, and given that the second site has to be, from what I understand, at least 1,300 kilometers from the first, where generally would the most effective location be for the second site?

I know this is hypothetical at this point, but if you were looking at two sites rather than one, which would require change in the treaty, and one of them was going to be Grand Forks, so in effect you would be going back to the original treaty before amendment, where would the second site likely be in general terms?

General O'NEILL. Sir, I am glad Senator Cohen is not here, because I think my answer would be the West Coast, Seattle, Washington, some place like that, although Senator Smith is looking at me, but I really think—

Senator SMITH. It is not going to be in New Hampshire, I know that. [Laughter.]

General O'NEILL. If you wanted to be closer to that threat area, the axis of China and North Korea, and you want to protect Alaska and Hawaii, I think I would put my next site in Seattle, Washington, or around that area, in Washington State.

Senator NUNN. Somewhere on the West Coast of the continental United States?

General O'NEILL. Yes, sir.

Senator NUNN. Now, how much worse off would we be with a two-site configuration with one of them being at Grand Forks and one of them being on the West Coast as you have identified, as opposed to starting from scratch if we did not have Grand Forks and we just decided that we wanted a two-site system? Is there a huge difference in capability by having to have one in Grand Forks and one wherever it made sense after that, as opposed to just deciding where two would be located?

General O'NEILL. Sir, we have looked at that, and I think there would be a significant difference with the West Coast scenario, but with the East Coast scenario it turns out there is not a significant difference, unless you are concerned about the SLBM where you really worry about that time line, but with the kinds of threats we are talking about, principally the rogue nation threat, it does not make a significant difference.

Senator NUNN. It does not make a significant difference? Where it would make a difference is on the East Coast threat by SLBM?

General O'NEILL. Yes, sir. If it was an SLBM within a few thousand kilometers of the East Coast, then you would really want to have interceptors located on the East Coast.

Senator NUNN. Instead of at Grand Forks? So that means that in that situation you would be better off with one on the East Coast and one on the West Coast?

General O'NEILL. Yes, sir, exactly.

Senator NUNN. Mr. Chairman, I have some others, but my time has expired.

Senator LOTT. We will have another round.

In general you have responded to this question, but I wanted to be specific. I think Senator Smith asked about this, but has there been any reduction in the ballistic missile threat that might lead us to conclude that the requirement for the THAAD or that the upper tier system in general has become less urgent?

General O'NEILL. No, sir.

Senator LOTT. In fact, the reverse is true?

General O'NEILL. The reverse is true, very true.

Senator LOTT. The BMD program review seems to have concluded that the lower tier TMD systems are sufficient for dealing with missiles that have a range of less than 1,000 kilometers. My understanding is that THAAD and the Navy upper tier also would play a very large role against such missiles.

Could you describe what the upper tier systems had against the shorter-range missile threats, and what deficiencies are we going to have to deal with if we have just the lower tier?

General O'NEILL. Well, I think the first thing that the upper tier systems had is protection of populations.

The lower tier systems are basically designed to protect, and can protect very credibly, populations against the air-breathing threat. But against the ballistic missile threat, the lower tier systems primarily are limited area defense systems. They can protect a military formation, an air base, a port, but they cannot reach out hundreds of kilometers.

They cannot protect, in the case of Navy theater-wide, a whole country against an attack by a missile of any range up to 3,000 kilometers. The threat exists for systems out to a 3,000-kilometer range, and we may have to face that threat soon.

Senator LOTT. How would this relate to our experience in the Gulf War, for instance?

General O'NEILL. Yes, sir. If we had a THAAD, the THAAD could provide—and I will not get into the exact numbers, but I would say over 100 kilometers.

They would be able to protect the whole nation of Israel, for example, rather than waiting until the threat entered the outskirts of Tel Aviv before engaging.

The synergy between an upper tier system and a lower tier synergy, or a lower tier system, is the capabilities of the upper tier complement the capabilities of the lower tier, so the effectiveness that you have if you have both kinds of systems is significantly enhanced over just having the lower tier system.

The upper tier systems work equally well as the lower tier systems for any threat of range greater than about 300 to 400 kilometers. They are much better in terms of keep-out range than these lower-tier systems. They can defend against a limited threat out to about 3,000 kilometers and defend populations. They provide more opportunity to shoot, see what you have done, see whether you have effectively intercepted, and then shoot again.

Whereas when you get to systems like Patriot or Navy area defense, you typically will have to shoot a salvo because you are not going to get a chance to shoot once and then wait, see if you missed, and then shoot again.

So in the case of Navy lower tier systems, or the PAC–3 system, you will shoot more interceptors than you would with an upper tier system that could shoot, see if it hit, and then shoot again, so you might have more cost-effectiveness using an upper tier system than a lower tier system.

Senator LOTT. You just made a powerful argument for moving forward aggressively.

General O'NEILL. That is why the THAAD is the flagship of the BMD program in TMD.

Senator LOTT. But it is being reduced.

General O'NEILL. Yes, sir. It was reduced in terms of—

Senator LOTT. We are reducing the flagship of the program.

General O'NEILL. Sir, it was reduced, and the philosophy for THAAD as being a centerpiece of the program, however, was retained with a lower level of funding.

Senator LOTT. It is strictly just the dollars and cents decision?

General O'NEILL. The principal reason for looking at the program was to find resources for higher priority DOD efforts. That is the principal reason for looking at the program.

A secondary reason was to rationalize the balance in the program and the balance between the parts of the program, but that was very clearly stated by Dr. Kaminski in his testimony, that the principal reason was because we did not have enough money to have an effective investment in Army, Navy, and Air Force programs.

Senator LOTT. But this is a very high priority?

General O'NEILL. Yes, sir. It is a very high priority program, very high.

Senator LOTT. I understand approximately $450 million has been added to your FYDP for Patriot, PAC–3, and Navy lower tier. Dr. Perry told the committee this was for acceleration for these programs, but it appears that the programs are actually slipping, yet if the additional funds are not for acceleration, what are they for?

General O'NEILL. Sir, the programs were destined to slip much more significantly than the roughly 1 year that you have seen on the statements, the congressional descriptive summaries we have sent in for those programs. The people behind fixing that were the Chairman of the Joint Chiefs, Dr. Perry, and Dr. Kaminski, who said those programs will not slip, we are going to get them as close to the congressionally mandated dates as possible, so they put more money into those programs than we had budgeted.

The reason the programs had slowed down had nothing to do with the intent of the Secretary or the Chairman. It was the fact that we were running into problems.

We had—in the PAC–3 program, if you remember there was a very divisive competition. The losing competitor protested, and we had to have an independent review go in and make sure that the Patriot was selected on a merit basis, and Patriot selection included the cruise missile threat and all of that. That took several months.

What happened after that time was, I told the program manager, I do not care about that slow start-up, I want to have the delivery of my hardware on the same day.

Well, he ruminated over that, then he came back to me, and it was very tough because I was not in a receptive mood. He came in and said, sir, I cannot give you that date in any reasonable way. You are going to have to accept the slip of the program, and I did, and I called it a fact of life slip.

Dr. Kaminski was not happy with that, and he was also not happy with the fact that as well as saying, "Sir, there has been a slip", we, the Army and the Navy, the three of us also need more money. But he made the decision to give us the money we said we needed, but above the Patriot, PAC–3, and the Navy area, the resources, additional resources, became very tough to get.

Senator LOTT. Senator Smith.

Senator SMITH. Thank you, Mr. Chairman.

General, let me just make one more follow-up point on all of this discussion regarding the NMD strategy. You talk about the three-plus-three, and you say that it would enable us to better leverage future technology and not bind ourselves to today's state of the art, if you will, but is that not true with any weapons system? You could say that about any weapons system for the most part, could you not?

General O'NEILL. Yes, sir, although, since this is the first—since the BMD program is a program that has very unique aspects like—we cannot defend today, and the difference between having nothing and having something is significantly different, between having an F–22 and an F–15, at least from my perspective, and I am not a fighter pilot.

Senator SMITH. But it seems to me if you look at the theater missile defense, it seems like the administration there is doing the opposite on the demarcation discussions.

I mean, if you restrict the performance of our theater defenses, in this case not faster than 3 kilometers per second, are we not, in essence, freezing technology at today's level?

General O'NEILL. Sir, I have absolutely no guidance that says I have to freeze the speed of my interceptors. As a matter of fact, the Navy theater-wide, which we are working as hard as we can, is above—it is 4–1/2, nominally. I think I can say that. It is not the exact number, but it is above 3.

Senator SMITH. Well, I think that agreement would make it a violation of the ABM treaty, as I read it. You do not agree with that?

General O'NEILL. No, sir, I do not agree with that.

Senator SMITH. That is an interesting response.

General O'NEILL. Well, I think with my exposure to the demarcation discussions, I have had nobody tell me that Navy theater-wide at 4½ kilometers per second would violate the treaty.

Senator SMITH. Then why are we talking about 3?

General O'NEILL. As a matter of fact, we have already—to my understanding, we have already had the Navy theater-wide through a compliance review process, and it was compliant.

Let me ask Admiral Hood if he could add anything.

Admiral Hood: That is correct. It is currently compliant.

Senator SMITH. I did not hear that response.

Admiral Hood: Yes, Senator, the Navy theater-wide program has been certified compliant last year by the compliance review group, and that compliance was forwarded to the Congress. That was based on the current interpretation of the treaty.

Senator SMITH. Why is it not part of the agreement, then?

Admiral Hood: I cannot answer that, Senator.

Senator SMITH. I am having a hard time answering it myself. It does not make a lot of sense to me. You are not making a lot of sense, guys.

General O'NEILL. Well, again, I am out of my element, sir, and I am not—the ABM treaty is something I work with every day, and it is difficult to have a program and not be concerned about how far I can take the systems that I want to develop without the considerations of the treaty, and we look at it every day.

Every year, every one of my programs is reviewed for compliance with the treaty, but in terms of the demarcation discussions, I think we have been consistent.

I think Dr. Kaminski said in his testimony he would not recommend that any of the TMD programs be constrained because of the ABM treaty, and if America has to have a particular program for defense of its forward deployed forces, we will have that program hopefully through either its being on its face treaty-compliant, or discussions with the Russians and advice and consent of the Senate to make sure that everyone understands.

Senator SMITH. Well, I am on your side and the position you are taking regarding the 4½ kilometers per second, but what I do not understand and what is, in fact, happening to the best of my knowledge is that in these discussions where for some reason we have some concern about offending the Russians so we are talking about 3 kilometers per second when, in fact, we have this capability.

Why do we not just tell the Russians that for theater missile defenses, thank you very much, but if we want 4½ kilometers per second, that is what we will have, we do not need any advice from you on that?

General O'NEILL. Again, I must add a disclaimer that I am not a treaty expert, but I think what the demarcation discussion is trying to do is establish a ceiling below which nothing has an intrinsic ABM capability, so General O'Neill does not have to have reviews every year on Patriot and THAAD and Navy area defense, because they are intrinsically air defense, tactical ballistic missile defense systems. It is beyond that where the Nation has to use the procedures we have today for all systems to just whether it is treaty-compliant or not.

What I think they were trying to do was simplify things.

Senator SMITH. I understand your point that you are not an expert on the treaty, and I respect that. I am not trying to pin you on the treaty. I am just asking for your opinion, and you have given it on the kilometers per second. Your feeling is we should not be restricted to any kilometers per second, whether it is 3 or 4½.

General O'NEILL. No, sir.

Senator SMITH. Let me just touch one more thing, Mr. Chairman, if you do not mind.

There are two very promising codevelopment programs that we are working on now with Israel of the Nautilus Laser and the ARROW. Since you are going to be leaving, could you just give us your assessment of how you feel those programs are going, and the mutual benefit of the two programs to our two countries?

General O'NEILL. I think the ARROW is an excellent program. It is a real success story. On the recent series of tests of the operational missile, they are three-for-three, three successes for three tests. They have not yet intercepted a target.

The first intercept flight will be conducted soon. I cannot give you the exact date because it is classified, but we are waiting with great positive expectancy for the next test of ARROW. The Israelis are committed to it.

It is always fun to go over there, because if you want to see people with a sense of urgency about missile defense, that is the mecca, and so whenever I go over to Israel, it gives me a lift, because people really are concerned about their survival, and people are really committed at doing missile defense over there so you do not have to argue with them about budgets and priorities and things like that.

As far as Nautilus is concerned, the Nautilus program is a directed energy program which is being looked at for close-in defense, ground-based laser for close-in defense of point targets, very important critical targets against cruise missiles and short-range ballistic missiles that may have penetrated the ARROWS tier envelope.

It is a very preliminary program. There have been some successes out at White Sands using some of the technology that was developed by the Army and the Navy in the high energy laser system test facility, which Senator Bingaman knows all about, but it is very early in the game for Nautilus as opposed to ARROW. ARROW is nearing its conclusion and its fielding.

Nautilus is still—there are a lot of questions about Nautilus. I am not funding Nautilus in the BMDO program because of its priority. It is being funded largely through the Army's SSDC's Base and Strategic Defense Command and Israel.

Senator SMITH. I assume if funds were to become available for that, you would support it?

General O'NEILL. I would support it, yes, sir.

Senator SMITH. Thank you very much.

Senator LOTT. Senator Nunn.

Senator NUNN. General O'Neill, we all understand that the faster you want something, the greater the risk in terms of technical performance and the system schedules and program and so forth and so on, and if you have a high enough threat and you need it badly enough, you are willing to basically pay that cost.

In your prepared statement you mentioned a couple of places, the issue of risk, and attempting to meet fixed deployment dates. Assuming Congress fully funds your 5-year defense request, could you give us your current assessment of the technical schedule and cost risks of trying to meet each of the deployment dates mandated in law in the fiscal 1996 authorization act, and then also of your plan program?

General O'NEILL. Yes, sir. I would be happy to do that for the record, if I may.

[The information referred to follows:]

The Theater Missile Defense (TMD) component of the ballistic missile defense program cannot meet the dates specified in Section 234 of Public Law 104–106. PAC–3 and Navy Area Defense are proceeding as quickly as the acquisition process will allow, with PAC–3 Initial Operational Capability (IOC) and Navy Area Defense User Operational Evaluation System (UOES) estimated for fiscal years 1999 and 2000, respectively. Because of fact-of-life technical difficulties and schedule risks, the dates specified in public law are not achievable for these two programs.

With respect to upper tier programs, the fiscal year 1996 Defense Authorization Act called for the department to establish a fiscal year 2000 First Unit Equipped (FUE) for THAAD. This date is no longer technically feasible. Similarly, the Department estimates that for Navy Theater Wide, a UOES deployment date of fiscal year 1999 and FUE of 2001 cannot be achieved.

Senator NUNN. Can you generally tell us, is there a lot of high risk in the time frames that are now set?

General O'NEILL. Sir, I think in the case of the lower tier TMD programs I would say low to moderate risk.

I would say in the THAAD, with the schedule that we have mentioned to Congress, which is now 2006 for first unit equipped, I would call that low risk, strictly dollar-driven.

With regard to the Navy theater-wide, we are going to make a decision after we have our tech demo in the 2001 time frame. I would think that is a low risk decision. In terms of deployment, it would be when we decide we need to deploy.

In terms of the National missile defense, I think the 2003 time frame, right now I would call moderate risk. That assumes that in 3 years we would be substantially increased in funding to make that 3-year deployment phase.

Senator NUNN. What are the high-risk areas?

General O'NEILL. The high-risk areas for the THAAD program are the accumulation of the testing data that would allow us to ensure that we have a probability of target kill that makes our investment in the numbers of missiles that we buy credible. We assume that each one has a single shot kill probability relatively high, so at most you would only have to fire a few at a target. So that is a concern I have.

I think one of the areas of risk is the area of coupling of one service's sensor to another service's weapon. That is a risk that is really mine to fix.

The reason that we have this program joint is because there needs to be somebody providing oversight of the capability of an Air Force sensor to provide vital information to an Army weapon, and that is harder for the Air Force to do and harder for the Army to do than for me to do, because they have their own constraints, and I do not have those constraints. So that is a high risk area, getting as much out of the system as we really, I think, need to get out of the system

I think in the NMD area the risk is the integration of the system elements. That is the biggest risk area, and one of the reasons is, for example, because of the constraints during the first 3 years of the three-plus-three, we are not going to test a booster that is compatible with the kill vehicle and that achieves the velocities necessary to do the mission.

My experts suggest that is not an unacceptable risk, but it is a high risk. We will not have a booster until about 2 years into the final 3-year slice. That is about $100 million total investment, but we just do not have it at the present level of funding.

Senator NUNN. Now, your last two THAAD missiles, have they not had two consecutive failures in terms of intercept?

General O'NEILL. Yes, sir, they have.

Senator NUNN. Is that to be expected? Does that surprise you? Where are you on the scale of expectation?

General O'NEILL. After 25 years of experience in this business, no, it does not surprise me, but I was very disappointed by the last shot.

The first shot a couple of months ago was, I think, a smashing success, but it did not smash into anything. The reason was that every function that the interceptor was supposed to perform was performed correctly, and what happened was at the last few seconds the divert engine that causes the kill vehicle to actually hit the target, we could see the lock on the seeker. The seeker was looking at the target, homing on the target, and it ran out of gas, it ran out of fuel, because it had done too much maneuvering early on.

We thought we fixed that, and as far as I was concerned, we were this close. I was upbeat, raring to go. We had a hold on Wednesday because of high winds. We went on Friday, and on Friday what happened was an umbilical broke between the kill vehicle and its supporting electronics module, and the power went off in the kill vehicle about 20 seconds into the flight, and so instead of the interceptor going up and homing, the interceptor went up and came down. It flew ballistic.

So that was an unfortunate disappointment for all of us, but the fix is very simple for that, so we are scheduled now for our next flight in April, and we are now combing through all of the possible failure modes that we could have due to some mechanical connection, or some grounding problem, or otherwise, and hopefully the next test will be an intercept.

We have 10 shots left, and we are optimistic that we will have many successes out of those 10.

Senator NUNN. You have got—the Navy upper tier LEAP program had two failures last year, is that right?

General O'NEILL. Yes, sir, it did.

Senator NUNN. So you have got 0 for 4 at the upper tier level.

General O'NEILL. O for 4 at the upper tier, yes, sir.

Senator NUNN. But you have got 10 more, and you are confident now. Of those 10, what would you consider reasonable, your reasonable expectations of the next 10?

General O'NEILL. Oh, three to five. I would expect three to five minimum.

Senator NUNN. Three to five successes out of 10?

General O'NEILL. Yes, sir.

Senator NUNN. General, what was the driving factor in establishing 3 years as the appropriate length of the initial national missile defense deployment phase leading up to the deployment decision? Could it have been 2, could it have been 4? Was there rationale, an analytical product that came out at 3? How was that arrived at?

General O'NEILL. Yes, sir. Of course, we had programs under the old technology readiness strategy that were maturing, and when we looked at our programs and I said to my national missile defense manager I want to have an integrated test. Well, how long will it take to mature, in a prudent way to mature these technologies and put them all together in an integrated test? He said, 3 years, and that is what led to it.

We could have pieces ready earlier than that. We could have pieces ready in 2 years, but we would not have this integration, which I think is a technology challenge as well as an engineering challenge.

People often say, well, putting things together is just engineering. It is simple. Leave it to the student. Well, that is not the truth, because a lot of technologies emerge when you take something you think you understand and put it together with something else you think you understand, because this system that you build with those two parts is different.

It is like an automobile. You have an engine and tires. You do not have an automobile until you integrate the pieces.

Senator NUNN. General, is it unusual in military systems to have development dates set by law? Have you ever seen another system where we had dates set by law?

General O'NEILL. No, sir, I cannot think of one. I can think of a cost. I think F–16 had a cost that we could not exceed.

Senator NUNN. The B–1 had costs, too, the B–1, and I think the B–2 has costs now, but dates are unusual for any military system, are they not?

General O'NEILL. Yes, sir.

Senator NUNN. How does the professional side judge those dates? Is that something that you think is good? Does it give you incentive, or are you worried about seeing dates in law of high technology programs?

General O'NEILL. The dates give me a lot of incentive, and the dates also help me justify my funding profiles within the Pentagon, so the dates have been helpful, and the dates were looked at with great scrutiny during the program review, I assure you.

Senator NUNN. Do you think if it becomes technically infeasible to meet the dates, will people in your position, your successors, basically say so?

General O'NEILL. Yes, sir. As we have, we did. We worked as hard as we could to maintain those dates for the lower tier TMD systems. We could not do it, and so we are coming back to testify and tell you that they are roughly 1 year later than you asked for, and we understand we are going to be under some sanction because of it, but I am not going to tell you I can deliver something I cannot deliver.

Senator NUNN. I think dates have a real benefit in one respect, if they do not cause people in the executive branch to do dumb, stupid, costly, ineffective, inefficient things, that is the question.

General O'NEILL. Yes, sir.

Senator NUNN. I assume so far you would testify that you have not done them.

General O'NEILL. I will testify to that. We have been as prudent as we can be, yes, sir.

Senator NUNN. That is a leading question. [Laughter.]

General O'Neill, section 234 of the 1996 authorization act contains a number of timetables for each of the so-called core TMD programs to achieve a UOES, IOC, and FUE milestone. To your knowledge, was DOD officially requested at any time last year to provide either of our committees on Capitol Hill, House or Senate, with estimates of achievable dates on each of these TMD programs?

General O'NEILL. Sir, we were at the staff level. We have worked with the staff of the committees.

Senator NUNN. You furnished that information?

General O'NEILL. We furnished that information about what was achievable and what would be achievable.

Senator NUNN. How contingent was that information you furnished on funding levels?

General O'NEILL. Quite so. For example, I remember in the case of SMTS we provided—and, of course, it is not part of my program, but it comes to mind as an example. We provided an estimate of what it would cost to have the earliest possible capability for SMTS, and that was clearly provided, and I think that was—

Senator NUNN. Was it tied to money in a funding profile?

General O'NEILL. Yes, it was, and that, I think, had a lot to do with the funding levels that we saw when the 1996 appropriation and authorization bills came out. They were tied very much to numbers that we said would provide the possibility of having these outyear dates reached.

Senator NUNN. Did the information you furnished also contain a risk assessment, low, medium, and high?

General O'NEILL. It was very qualitative, yes, sir, but it was—as a matter of fact, we provided—in the case of SMTS, I remember we provided three schedule profiles, a low risk, medium risk, and high risk.

Senator NUNN. Thank you, Mr. Chairman.

Senator LOTT. Thank you, Senator Nunn.

SMTS, that is a space missile tracking system?

General O'NEILL. Yes, sir.

Senator LOTT. I understand that you signed a memorandum of understanding with the Air Force on the management of that SMTS. How is that relationship working out, and what is your assessment of the program at this point?

General O'NEILL. Well, sir, I think it is working out fairly well. There were some problems that developed with the pressure of budgetary adjustments and inflation adjustments and the fact that not every staff officer in BMDO or the Air Force understood my vital role in that program. I found out about some changes in the program after they occurred, changes which I would have not concurred with.

The understanding I have with the Air Force is that any time I nonconcur with an Air Force decision regarding that program, it must go up to Dr. Kaminski for his judging of who is right and who is wrong.

An example of that was a recent rescission of $51 million that—I nonconcurred in that decision. The Air Force concurred. It went to Dr. Kaminski and he judged at the time that the Air Force was correct and that the rescission would stand, but that is the way it is supposed to work, and I have no problem with that.

It is just that I need to be brought in early in the game so that I can put my arguments together. If I want to make a strong argument and an intelligent argument, it is hard for me to do it on the fly, walking down the hall, grabbing my boss by the coattail and saying, I do not like that. I would like to work it with you.

Senator NUNN. We hope you do not have to do that very often. That is the way we operate around here. [Laughter.]

Senator LOTT. What is your view on the need for greater competition in this program?

General O'NEILL. Sir, it is something that is being looked at right now. I guess I would have told you a week ago. I do not understand why it is a big issue.

We had an EXCOM meeting with the Air Force on Friday, and there were some strong arguments offered in favor of relooking at the competition aspects of the program. So I have decided, along with the Air Force, to work this issue over the next few weeks and then find out whether the concerns that were voiced about not having competition hurting the program are true or not. I suggest that that kind of remains to be seen whether we are comfortable with the competition that we have right now.

As you know, there was a competition. TRW won the competition. The other contractor, Rockwell, was asked to follow along in a limited amount of money, and questions have been raised as to whether that is a prudent strategy, because we have so far to go, still 2 or 3 more years before we make our big decision about engineering development, and we do not want TRW to feel too comfortable during that period of time.

Senator LOTT. Talking about dates, did the 1991 Missile Defense Act not have a date in it?

General O'NEILL. Yes, sir. For TMD? The date for TMD in the 1991 bill said a significant——

Senator LOTT. No, NMD.

General O'NEILL. I think it did have.

Senator NUNN. I think it had a 1996 or earliest practical date achievable by technology. It was some kind of hedge.

General O'NEILL. There was a prudence comment in there.

Senator NUNN. By law we already have a system operating based on that act. [Laughter.]

Senator LOTT. How is it doing? [Laughter.]

If a decision were made this year to deploy an NMD system by the year 2003, what would it cost between now and 2003 for this program?

General O'NEILL. Sir, I would guess it would cost about $8 billion total. That includes all the R&D, about $3 billion R&D including a continuation of the R&D for things like SMTS advanced capabilities as well as, approximately, that includes about $5 billion for the installation of the equipment at the initial site, so about $8 billion total, including R&D.

Senator LOTT. General, we may have a couple more questions for the record, and we will keep that open.

We thank you for your time, and we look forward to working with you, at least till the end of May.

The hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

THREAT

Senator THURMOND. General O'Neill, has there been any reduction in the ballistic missile threat that might lead us to conclude that the requirement for THAAD, or an upper tier system in general, has become less urgent?

General O'NEILL. No, the requirement for missile defenses is immediate and critical. Based on an examination of the nature of the threat, the systems that could be made available in the near term, and the funding available for missile defense, the DOD decided to stress the fielding of PAC–3 and Navy Area Defense as quickly as possible. Both of these lower tier systems principally address the threat of shorter range missiles. These will be fielded first and the upper tier will be fielded subsequently. In order to have an earlier upper tier capability for use in contingencies, we are developing a User Operational Evaluation System (UOES). The primary purpose of the THAAD UOES is for early user involvement in design and testing of the THAAD system and is not intended to be a fieldable system. Again, it would only be made available for contingency use should national security warrant. We anticipate an initial THAAD UOES capability by the end of fiscal year 1998.

UPPER TIER

Senator THURMOND. General O'Neill, the BMD Program Review seems to have concluded that the lower tier TMD systems are sufficient for dealing with missiles that have a range less than 1,000 kilometers. My understanding is that THAAD and Navy Upper Tier also would play a very large role against such missiles. Could you describe what the upper tier systems add against these shorter range missile threats, what the deficiencies are if we rely exclusively on lower tier systems, and how all this relates to our experience in the Gulf War?

General O'NEILL. BMDO is making a significant investment in upper tier systems. Systems, such as THAAD and Navy Theater Wide, are being planned and designed to intercept theater ballistic missiles at longer ranges and higher altitudes than lower tier systems. Their long range intercept capability will make possible the protection of broad areas, dispersed assets, and population centers against threats with ranges between 600–3,000 kilometers. The higher altitude engagements afforded by upper-tier systems result in atmospheric dispersion of potentially hazardous debris associated with nuclear, chemical, and biological warheads. Had an upper tier system been available for the Gulf War against the relatively short range Scud-B threat, the battlespace would have been significantly extended allowing multiple engagement opportunities and higher probabilities of intercept and kill. In addition, the upper tier systems' capability to intercept Scud-Bs at greater ranges would have negated the problem of falling debris, and the resulting collateral damage after intercept. The lower tier systems are critical for terminal intercept capability of short range missiles at low altitudes. Without both the Upper and Lower Tiers there is lower confidence in the ability to defend assets on the ground.

Senator THURMOND. General O'Neill, the budget you presented here last year included approximately $1.3 billion in the Other TMD program element for "Advanced capabilities Acquisition" through Fiscal Year 2001. This is money that was budgeted to support the next core TMD program. Since Congress designated the Navy Upper Tier as the next core program in law, these funds should have been available to support Navy Upper Tier acquisition. The BMD program review, however, only includes $600 million for Navy Upper Tier in the FYDP. Does this not mean that the program review actually produced a $700 million cut in Navy Upper Tier funding? What happened to this money?

General O'NEILL. The BMD program review eliminated $1,173.2 million from the Joint TMD Program Element over the FYDP specifically earmarked for Advanced Capabilities. The advanced capabilities effort was to support the next TMD acquisition program with a decision in fiscal year 1998. The recent program review which reduced the overall BMDO budget and FYDP significantly, eliminated these funds and decided to fund the MEADS effort only through the fiscal year 1998 program definition and validation (PDV) and increase significantly the existing level of Navy Upper Tier funding to do a demonstration program leading to a decision on EMD in fiscal year 2002.

Based on the threat projections, BMD top line constraints, other mandated BMD priorities and the technical maturity for entering the acquisition phase the current Navy Upper Tier demonstration program is at the appropriate funding level and the right approach.

ADDITIONAL FUNDS

Senator THURMOND. General O'Neill, I understand that approximately $450 million has been added to your FYDP for Patriot PAC–3 and Navy Lower Tier. Dr. Perry told the Committee that this was for "acceleration" of these programs, but it appears that these programs are actually slipping. If the additional funds are not for acceleration, what are they for?

General O'NEILL. The Navy Area (Lower Tier) Theater Missile Defense (TMD) program has been delayed due to technical risk. Funding added to these programs has been used to solve these technical difficulties. At the same time the schedule was revised to reflect these technical difficulties, a review of target requirements resulted in additional shortfalls, which would have further delayed the program. Additional funding for these shortfalls will allow the Navy Area TMD Program to purchase targets and conduct lethality studies planned as part of the program. In the case of PAC–3, the Program Review added funds to reduce development risk. This risk reduction will be achieved with the addition of rigorous engineering tasks in the development of highly critical subsystems. Additional work being performed to assure performance, which extends the planned overall development time for the PAC–3 missile.

TMD PROGRAM DATES

Senator THURMOND. General O'Neill, as you know, section 234 of Public Law 104–106 establishes a core TMD program and specifies deployment milestones for each of the systems. I understand that, of the seven dates specified in law, your budget allows you to make one. Can you tell us exactly what the dates would be if Congress approved your FYDP and how these compare to the dates currently in the law?

General O'NEILL. The following chart depicts the deployment milestones in Section 234 of Public Law 104–106 with those in the fiscal year 1997 President's Budget (FYDP) for PAC–3, THAAD, Navy Area (Lower Tier) and Navy Theater Wide (Upper Tier).

Program	Fiscal year 1996 authorization act	Fiscal year 1997 PB (FYDP)
PAC–3	FUE during fiscal year 1998	Fiscal year 1999
THAAD	UOES NLT fiscal year 1998	Fiscal year 1999[1]
	FUE fiscal year 2000	Fiscal year 2006
NLT	UOES fiscal year 1997	Fiscal year 2000[2]
	IOC fiscal year 1999	Fiscal year 2002
NUT	UOES fiscal year 1999	N/A
	IOC fiscal year 2001	N/A

[1] Initial UOES capability is achieved in fiscal year 1998

[2] Navy delivers computer upgrades in fiscal year 1998 and missiles in fiscal year 2000.

TECHNOLOGY READINESS VS. DEPLOYMENT READINESS

Senator THURMOND. General O'Neill, last year you presented the NMD program as a "Technology Readiness" program. This year it is being described as a "Deployment Readiness" program. But I recall, you were already talking about the 3-plus–3 program last year. What has changed other than the semantics?

General O'NEILL. The change from "Technology Readiness" to "Deployment Readiness" marks a significant redirection of our NMD efforts and positions us to be ready to deploy an NMD system in the near future if required.

The "Technology Readiness" program, which was instituted after this Administration's Bottom-up Review, was designed to mature the most stressing element technologies necessary to eventually field a National Missile Defense. This program allocated funding to the technical "long poles" to shorten the time which would eventually be required for a deployment. The focus of the "Technology Readiness" program was primarily on the development of an exoatmospheric kill vehicle which could eventually be deployed to intercept reentry vehicles as part of the Ground-Based Interceptor. We stated that successful demonstration of this "long-pole" (e.g. a successful intercept flight) could be the basis for a decision to deploy. However, the "Technology Readiness" program never developed all of the NMD elements on a time line to demonstrate a system capability. Therefore, it would have been an extremely high risk decision. The "Deployment Readiness" program was selected to overcome these difficulties.

The "Deployment Readiness" program, adopted by the DOD following a Ballistic Missile Defense Program Update Review earlier this fiscal year, shifted the focus of the NMD to provide a more balanced emphasis on all elements of the NMD system and significantly increased the emphasis on the system engineering and integration of the elements. This shift in emphasis was accomplished by establishing specific dates when a NMD deployment decision could be made and by fixing the date for demonstration of an integrated NMD system. The net effect of these changes has been a realignment from an essentially open-ended technology development activity to a very focused acquisition-like program.

Senator THURMOND. General O'Neill, if the decision were made this year to deploy an NMD system by the year 2003, what would it cost between now and 2003 for this program? Describe the funding differences between the various architectures that could be available by 2003—that is ground-based single-site, ground-based multiple-site, sea-based, or some combination.

General O'NEILL. The NMD "Technology Readiness" program is now evolving into a "Deployment Readiness" program and has been recently designated as a Department of Defense Major Acquisition Program. The Department is formalizing this program, its goals, and its costs. A Cost Integrating Product Team will be formed to further refine the cost estimates in the next few months. The following descriptions and estimates are based on our assessments during the Ballistic Missile Defense Program Review and should provide the appropriate order of magnitude costs.

The RDT&E funding for the current NMD 3+3 program supports a single-site IOC by 2003 at high risk; however, production and MILCON funds have not been included in the FYDP since a deployment decision has not been made. Given a deployment decision now, we would recommend the following FYDP profile. RDT&E funds beyond fiscal year 2000 are used to continue flight testing and achieve system confidence, as well as continuing development to meet emerging threats and to achieve an objective NMD capability.

	(TY$M)							
	Fiscal year 1997	Fiscal year 1998	Fiscal year 1999	Fiscal year 2000	Fiscal year 2001	Fiscal year 2002	Fiscal year 2003	Fiscal year 2004 [2]
RDT&E [1]	508	511	413	317	317	400	400	400
Production/MILCON	....	50	150	1,300	1,250	1,000	800	400
Total	508	561	563	1,617	1,567	1,400	1,200	800

[1] Fiscal year 1997 Presidents Budget. Production/MILCON not currently in FYDP

[2] Funding continues in fiscal year 2004 to achieve FOC of the 3+3 program.

Making a deployment decision now versus a decision in fiscal year 2000 does not cause a noticeable shift forward in production or MILCON dollars since NMD system development takes at least three years. While additional RDT&E funds across the FYDP may not reduce development time, they would significantly reduce schedule and programmatic risk.

The NMD system capable of IOC by 2003 is that defined in the 3+3 Program: 20 interceptors and a GBR at a single site, BMC^3, 2 UEWRS, and other existing radars. FOC, achieved by adding 80 interceptors, could be accomplished a year later, in 2004. Multi-site capability would be additive to this architecture and lag at least one year in order to capitalize on lessons learned from the first site. Because the Production and MILCON costs above are for a generic NMD site with existing, modified facilities, the cost of each additional site roughly mirrors the amount and spread of that shown above. Some reduced costs would be realized with large missile production, no duplicative CINC BMC^3, and no further UEWRS.

ANNUAL BUDGET

Senator THURMOND. General O'Neill, when you appeared before the Armed Services Committee with Dr. Kaminski earlier in March, you expressed your support for the program that he presented. Did you mean that you support the program assuming that you have to live with a flat annual budget of $2.8 billion, or did you mean that you believe that $2.8 billion per year is enough to do all the things that we should be doing?

General O'NEILL. Given an externally imposed $2.8 billion topline, I believe the Department's BMD Program review recommendation is a good one.

BMD PROGRAM REVIEW

Senator THURMOND. General O'Neill, could you describe the role that you played in the recent BMD Program Review Update Review?

General O'NEILL. The BMD Program Review was lead by the Director, Strategic and Tactical Systems, at the direction of USD(A&T). The review involved all the major DOD staff agencies, the Services, and the Joint Staff. The BMDO was among the participants in the review. When the review was complete, USD(A&T) requested my personal comments, as well as confirmation from me that the revised program was executable. Based upon my insights and the results of the program review, I offered recommendations and suggested adjustments to improve executability.

NATIONAL INTELLIGENCE ESTIMATE

Senator THURMOND. General O'Neill, I understand that you did not agree with all of the aspects of the recent National Intelligence Estimate on the ballistic missile threat to North America. I understand that you can't get into any detail in an open session, but could you provide a general summary of your differences with the NIE?

General O'NEILL. Since U.S. experts are not the developers of foreign materiel, the NIE's projection of foreign capability can not have absolute accuracy. The NIE's identification of "wildcards" and "intelligence gaps" as critical unknowns underscores this uncertainty and the need to quantify its effects.

THAAD

Senator THURMOND. General O'Neill, the BMD Program Review recommended two changes to the THAAD program. First, that we go into production based essentially on the UOES design. This would allow deployment to be accelerated and save about $1 billion. But, second, it was decided to take $2 billion out of the THAAD FYDP rather than the $1 billion that could legitimately be cut. This means a six to eight year gap between UOES and IOC. This does not look like a sustainable program to me. Do you believe that it makes sense to structure an acquisition program this way? Won't it actually cost more overall to stretch the program out this way?

General O'NEILL. The THAAD program is proceeding at a prudent pace to add wide area defenses and defenses against the longer range theater missiles. In order to have an earlier upper tier capability for use in contingencies, we are developing a User Operational Evaluation System (UOES). The current THAAD program was restructured in terms of technical content and schedule, as a result of the $2.1 billion reduction in FYDP funding. The restructured program slipped from an FUE in fiscal year 2002 to an FUE in fiscal year 2006. The THAAD Program Office estimated that the restructuring would add a cost of $778M to the program. However, the program, as currently structured, is executable. Current funding levels will allow for FUE in 2QFY06, or 7.5 years after the initial UOES capability is achieved in 4QFY98.

REPORTS

Senator THURMOND. General O'Neill, The Department currently owes us a number of reports required by fiscal year 1996 legislation, including reports on Corps SAM, Boost Phase Intercept, Navy Upper Tier and Space-Based Laser. What is the status of these reports and when can we expect them?

General O'NEILL. The reports have been drafted, are completing their coordination within DOD, and I expect them to go to the Congress in June.

SPACE AND MISSILE TRACKING SYSTEM

Senator THURMOND. General O'Neill, last year you signed a Memorandum of Understanding with the Air Force on management of the Space and Missile Tracking System. How is that relationship working out? What is your overall assessment of the SMTS program at this point, including your view of the need for greater competition within the program?

General O'NEILL. The Air Force and I came to an understanding of what BMDO requires from the Space and Missile Tracking System (SMTS) and we formalized that agreement with a Memorandum of Understanding (MOU). The Air Force and BMDO have gone through some growing pains in living with the MOU but, in general, the relationship between BMDO and the Air Force is good.

The Air Force has formed an Executive Committee made up of the Air Force Acquisition Executive, Deputy Under Secretary of Defense (Space), Air Force Space Command, and myself. This Executive Committee is responsible for oversight of the SMTS program.

At this time, the acquisition strategy for the SMTS program is being reevaluated in light of the first launch and IOC dates mandated by the fiscal year 1996 Authorization Bill. Alternative competitive strategies are being explored through an industry day solicitation for a DemVal competitor to TRW/Hughes. I believe that such competition will help maintain cost control and get the best system for the government.

Funding instability is the most serious problem faced by the SMTS program in meeting the Congressional direction. The current FYDP budget cannot support the accelerated schedule. The Air Force is initiating the process to increase the out year budget. However, this will require continued support from Congress.

VALUE OF BMD

Senator THURMOND. General O'Neill, in your opinion, how valuable is BMD—both theater and national—as a foreign policy tool to help us deal with intimidation, inhibit escalation, and deter the spread and use of weapons of mass destruction?

General O'NEILL. In my opinion, theater missile defense and national missile defense are valuable foreign policy tools which help our nation withstand intimidation from hostile countries possessing ballistic missiles, which dampen the escalation of tensions associated with the deployment of ballistic missiles, and which inhibit the proliferation of ballistic missiles and the weapons of mass destruction they might carry by reducing their value relative to their cost. As is explained very well in the Department's recent report, *Proliferation: Threat and Response,* April 1996, ballistic missile defense is a critical element the Defense Department's Counterproliferation Initiative, one of whose objectives is "to convince potential and actual proliferants that NBC weapons will be of no value because the United States and its coalition partners will have the capability to deny or limit" their utility.

BUDGET ADJUSTMENTS

Senator THURMOND. General O'Neill, what adjustments to your fiscal year 1997 budget request and FYDP would be needed in order to meet the dates specified in Section 234 of Public Law 104–106? Also, what adjustments would be needed if we wanted an NMD IOC in 2003?

General O'NEILL. **Theater Missile Defense.** The TMD component of the ballistic missile defense program cannot meet the dates specified in Section 234 of Public Law 104106. PAC–3 and Navy Area Defense are proceeding as quickly as the acquisition process will allow, with PAC–3 Initial Operational Capability (IOC) and Navy Area Defense User Operational Evaluation System (UOES) estimated for fiscal years 1999 and 2000, respectively. Because of fact-of-life technical difficulties and schedule risks, the dates specified in public law are not achievable for these two programs.

With respect to upper tier programs, the fiscal year 1996 Defense Authorization Act called for the Department to establish a fiscal year 2000 First Unit Equipped (FUE) for THAAD. This date is no longer technically feasible. Similarly, the Department estimates that for Navy Theater Wide, a UOES deployment date of fiscal year 1999 and FUE of 2001 cannot be achieved.

The **National Missile Defense** "Technology Readiness" program is now evolving into a "Deployment Readiness" program and has been recently designated as a Department of Defense Major Acquisition Program. The Department is formalizing this program, its goals, and its costs. The following descriptions and estimates are based on our assessments during the Ballistic Missile Defense Program Review. A Cost Integrating Product Team has been formed to further refine the cost estimates in the next few months.

The RDT&E funding for the current NMD 3+3 program supports an IOC by 2003 at high risk; however, production/MILCON funds have not been included in the FYDP since a deployment decision has not been made. RDT&E funds beyond fiscal year 2000 are used to continue flight testing and achieve system confidence, as well as continuing development to meet emerging threats and to achieve an objective NMD capability. Funding (given an fiscal year 2000 deployment decision) to achieve a 2003 IOC would be as follows:

	(TY$M)						
	Fiscal year 1997	Fiscal year 1998	Fiscal year 1999	Fiscal year 2000	Fiscal year 2001	Fiscal year 2002	Fiscal year 2003
RDT&E[1]	508	511	413	317	317	400	400
Production/MILCON	....	....	180	1,120	1,690	1,420	700
Total	508	511	593	1,437	2,007	1,820	1,100

[1] Fiscal year 1997 Presidents Budget. Production/MILCON not currently in FYDP

The following FYDP profile would significantly lower overall program schedule risk and increase confidence in the system fielded in fiscal year 2003:

	(TY$M)						
	Fiscal year 1997	Fiscal year 1998	Fiscal year 1999	Fiscal year 2000	Fiscal year 2001	Fiscal year 2002	Fiscal year 2003
RDT&E	808	811	693	467	417	400	400
Production/MILCON	....	....	180	1,120	1,690	1,420	700
Total	808	811	873	1,587	2,107	1,820	1,100

Additional RDT&E funds would be expended in the following areas:

- Accelerate new/modified booster for integrated system test in fiscal year 1999.
- Procure additional ground/flight test hardware to element single point failure modes.
- Conduct hardness testing of both EKV contractor designs.
- Add flight tests:

  - Increase number of flight tests per year.
  - Add 2 on 2 flight test.
  - Increase ground/HWIL testing.
- Continue competitive developments to reduce risk (performance and cost):
  - Additional competitive EKV intercept flights.
  - Targets.
- Increase deployment planning/preparations:
  - Complete environmental assessments of possible deployment location.
  - Implement element contract options to perform logistics analyses.

QUESTIONS SUBMITTED BY SENATOR SAM NUNN

PUTTING FUNDING WHERE THE THREAT IS

Senator NUNN. General O'Neill, isn't the increase in funding for the Patriot PAC–3 and Navy Lower Tier, or "Area," system a case of the CINCs wanting to insure adequate funding of TMD programs to counter the existing threat? Doesn't it make sense to put first priority on the threat that's here today?

General O'NEILL. The increased investment in PAC–3 and Navy Area Defense is to insure both programs are adequately funded to guarantee timely delivery to the warfighter. Both of these lower tier systems address the immediate threat of shorter range missiles. The plan described in the President's Budget submission is better matched to the missile threats we will be facing and supports the CINCs' ranking of Theater Missile Defense on their Integrated Priority List. But I believe THAAD should be equal in priority with the lower tier systems, i.e., the "TMD Core Programs" are the priority, not just the lower tier part.

INCREASED FUNDING FOR MEADS

Senator NUNN. Gen. O'Neill, does the Program Review decision to increase the funding for the MEADS program reflect the priority of the Regional CINCS? How important to those CINCs is the ability to defend maneuver forces against missile attacks once they move out from under the cover of fixed TMD systems?

General O'NEILL. Yes, the program review decision to increase MEADS funding does reflect the priorities of the regional CINCS. The CINCs Integrated Priority Lists state the requirement for defense of maneuver forces from ballistic and cruise missiles.

TECHNOLOGY READINESS VS. DEPLOYMENT READINESS

Senator NUNN. General O'Neill, last year, BMDO was pursuing a National Missile Defense (NMD) program called "Technology Readiness." Under this program, after 3 further years of development, DOD would have an option to deploy a limited NMD system after another 3 years. This year, BMDO intends to pursue a new NMD program called "Deployment Readiness." Under "Deployment Readiness," DOD will be ready to make a deployment decision after 3 years of further development, and would have a deployed system 3 years after that decision. Given the similarities in timetables, would you explain the difference between the old "Technology Readiness" program and DOD's new "Deployment Readiness" program? If last year you needed 3 years of R&D prior to making a deployment decision, then why does it still take 3 years of R&D *this* year before we are ready to make that decision?

General O'NEILL. The "Technology Readiness" program which was instituted after this Administration's Bottom-up Review was designed to mature the most stressing element technologies necessary to eventually field a National Missile Defense within very limited resources. This program allocated funding to the technical "long poles" to shorten the time which would eventually be required for a deployment. The focus of the "Technology Readiness" program was primarily on the development of an exoatmospheric kill vehicle which could eventually be deployed to intercept reentry vehicles as part of the Ground-Based Interceptor. We stated that successful demonstration of these "long-poles" (e.g., a successful intercept flight) could be the basis for a decision to deploy. However, the "Technology Readiness" program never developed all of the NMD elements on a timeline to demonstrate a system capability. Therefore it would have been an extremely high risk decision. The "Deployment Readiness" program was selected to overcome these difficulties.

The "Deployment Readiness" program adopted by the DOD following a Ballistic Missile Defense Program Update Review earlier this fiscal year shifted the focus of the NMD to provide a more balanced emphasis on all elements of the NMD system and significantly increased the emphasis on the system engineering and integration of the elements. This shift in emphasis was accomplished by establishing specific dates when a NMD deployment decision could be made and by fixing the date for demonstration of an integrated NMD system. The net effect of these changes has been a realignment from an essentially open-ended technology development activity to a very focused acquisition-like program.

The characterization that the "Technology Readiness" would complete development within 3 years and could then deploy a system within 3 years does not describe the baseline "Technology Readiness" program but an accelerated execution that might have been possible given additional funding. The increased funding appropriated by Congress for fiscal year 1996 has been used to fund exactly such a shift as we transitioned from the "Technology Readiness" to the "Deployment Readiness" program.

QUESTIONS SUBMITTED BY SENATOR CARL LEVIN

BALLISTIC MISSILE DEFENSE REVIEW

Senator LEVIN. General O'Neill, the Department of Defense recently announced a restructuring of our ballistic missile defense programs to focus on countering the most near-term threats. This restructuring was supported by the JROC (Joint Requirements Oversight Council), which had input from the regional CINCS, and yourself. The restructured program stresses the near-term deployment of theater missile defense systems, namely PAC–3 and Navy Area Defense System (or "Lower-Tier") designed to counter existing threats that our forces face today from short- and medium-range theater ballistic missiles. Then the program would stress technology maturation and then deployment of theater defense systems, namely THAAD and the Navy Theater Defense System (or "Upper-tier"), designed to counter emerging threats from theater missiles. Finally, the National Missile Defense portion of the restructured program, the so-called "three plus three" aspect, would continue to develop technology for 3 years to enable us to make a deployment decision that could be implemented in another 3 years—if warranted by the threat. But the "three plus three" program also recognizes that if we have more time to develop technology, the system we eventually deploy would be far more capable than what current technology would permit in 2003, at the end of the 6 years. Do you agree with the notion of placing the priority on near-term deployment of systems that can counter the threats we already face, namely short and medium range theater missiles?

General O'NEILL. Yes, based on the threat, the systems available in the near term, and the funding available for missile defense, the Department decided to stress the fielding of PAC–3 and Navy Area Defense which address the immediate threat of shorter range missiles. However, fewer dollars for upper tier systems means that capability to defend wide area against the gamut of existing theater threats will be delayed.

Senator LEVIN. Is it important in your view to provide the resources necessary to make sure we can deploy PAC–3 and Navy Area Defense/Lower Tier as soon as possible, as the restructured program does?

General O'NEILL. Yes, based on an examination of the threat, the systems available in the near term, and available funding, the Department decided to field PAC–3 and Navy Area Defense as quickly as possible. Therefore, the Department increased investment in PAC–3 and Navy Area Defense to ensure timely delivery to the warfighter. The Program Review increased funding for PAC–3 by $345 million and the Navy Area Defense program by $186 million over the Future Years Defense Plan, fiscal years 1997–2001. These increases provide PAC–3 FUE in fiscal year 1999 and a Navy Area Defense User Operational Evaluation System (UOES) for contingency use in fiscal year 2000. But I believe THAAD should be equal in priority with the lower tier systems, i.e., the "TMD Core Programs" should be the priority, not just the lower tier elements.

Senator LEVIN. Do you agree that deciding now to deploy an NMD system in 2003 is not warranted by the threat we see today, and also would lock in technology that is not as capable as would be available if we continued to develop the technology instead of deploying in 2003?

General O'NEILL. I believe that it would be premature to make an immediate deployment decision today. The Deployment Readiness Program implemented by the Department earlier this year is specifically structured to address this uncertainty. Our current program continues to develop the technology required for a capable NMD system while simultaneously positioning us to allow a deployment within three years if the threat warrants. It is my belief that the technology we would deploy at the end of the three year development would be fully capable of countering the expected threat. With this program we avoid making a premature commitment to the deployment of an NMD, preserving the option to introduce advanced technology, but still have the capability to respond in a timely manner when required.

Senator LEVIN. Given the intelligence estimate that a new indigenous ICBM development effort would take some 15 years, do you agree with Secretary Perry and Under Secretary Kaminski that this NMD program is prudent and that we should take the time to produce the best technology we can field before the threat actually emerges?

General O'NEILL. I am in complete agreement with Secretary Perry and Under Secretary Kaminski that the NMD Deployment Readiness Program is an appropriate and prudent course of action given the current threat projections. The nation must be prepared to respond in a reasonable time period if such a threat materializes. The deployment readiness program is designed so that we can respond, within 6 years, while avoiding commitment to an immediate decision on deployment. I think a thorough reading of the NIE would suggest that 15 years is an incorrect interpretation of the time it would take for development of an indigenous ICBM capability—if we include all 50 states as the USA. I believe that there is a fairly great uncertainty associated with the development estimate, and that such a threat could appear much sooner—that underscores the logic of the 3 + 3 program strategy.

TECHNOLOGY DEVELOPMENT

Senator LEVIN. General O'Neill, there is sometimes a notion here in Congress that if we only spend more money on all these programs, we could speed them up dramatically. But isn't it the case that some technology development takes a certain amount of time that is essentially independent of spending, because you have to permit time to develop, test, refine, integrate, test again, and so on? If so, please describe the process of technology development that would prevent accelerating programs simply by adding more money to the program.

General O'NEILL. There is certainly an optimum pace for developing products which allows adequate time for defining the requirements; exploring alternate concepts to determine the most efficient and effective approach to meeting those requirements; designing a system; demonstrating and validating that the proposed design will meet those requirements through a combination of modeling and testing, followed by producing the system; and finally deploying the system with adequate training and logistic support to ensure its successful operation. The speed at which the process is accomplished is a balance between optimizing the solution to the most efficient and effective system achievable with the state of technology available, and accepting a certain amount of risk of errors in order to field a system more rapidly. Increased up-front funding allows more of the steps required to develop a system to be accomplished in parallel, which lowers the overall cost of deploying a system. However, there is always a limit to how many things can be accomplished in parallel without raising the risk of mistakes to an unacceptable level. Invariably there are some steps, i.e., final design of a system, that must wait for the results of earlier steps such as analysis of test results. In time of crisis, the Nation is always willing to accept increased risk of inefficiencies to get systems in the field as quickly as possible; while if there is no imminent perceived threat a slower, a more conservative pace is the norm.

TMD PROGRAM DATES

Senator LEVIN. Are there any technological reasons, or concerns about excessive risk, that would make it difficult or unwise to meet all the IOCs incorporated in the fiscal year 1996 National Defense Authorization Act for the "core" TMD programs? For example, your testimony suggested some "fact of life" schedule slips for PAC–3. Is it not the case that additional money could not erase that slippage?

General O'NEILL. To meet the First Unit Equipped (FUE) date of fiscal year 1998 (as specified in the fiscal year 1996 National Defense Authorization Act) would incur excessive risk for the PAC–3 program. The PAC–3 schedule is dictated by sequential requirements to systematically integrate missile subsystems, verify performance, conduct flight tests, and perform post flight analysis. Historically, extensive time is required to resolve assembly and processing issues encountered during the first flight test of a new missile design. Due to the serial nature of the development process, additional funding will not accelerate the PAC–3 FUE date. Acceleration could only be accomplished through expensive concurrent activities which would greatly increase programmatic risk.

In the case of the Navy Area TMD Program, technical difficulties have caused delays. The Navy Area program is schedule-limited, meaning that regardless of funding, program delivery cannot be accelerated beyond a certain point because of the time required to address technical difficulties. As a result of this schedule limitation, the earliest the program could deliver would be a User Operational Evaluation System (UOES) in 4QFY99 and First Unit Equipped (FUE) in 2QFY02.

Senator LEVIN. What information was sought by and provided last year to the authorization staff concerning the IOC dates that are achievable for the "core" TMD programs. Were the dates enacted into law the same ones that were provided by your office?

General O'NEILL. There were discussions on an informal staff to staff basis on the mandatory IOC dates contained in the fiscal year 1996 Defense Authorization Act. The Department did not advocate any specific set of IOC dates, nor did they advocate specifying mandatory IOC dates in the bill.

DEPLOYMENT

Senator LEVIN. Would you advocate deploying a missile defense system to meet an arbitrary deadline if the technology is not mature or ready, and the system would not work well?

General O'NEILL. No. Clearly I would not advocate deploying a missile defense system to meet an arbitrary deadline if the technology was not mature resulting in a system with poor or no performance. The NMD Deployment Readiness Program is specifically tailored to prevent this approach. The deployment decision is keyed to the detection of a threat to the United States and not an arbitrary deadline. The earliest NMD system that would be deployed would be based on the results of the Integrated System Test in fiscal year 1999. This test would demonstrate that the technology was sufficiently mature to provide an acceptable level of system performance. If the threat did not warrant deployment or if an acceptable level of performance is not achievable, additional development would be performed.

ARROW

Senator LEVIN. General O'Neill: The U.S. and Israel have been cooperating on a joint missile development program called Arrow that is intended for deployment in Israel. Would you please describe the benefits to the United States of participating in the Arrow program, and would you agree that we are getting a significant benefit in terms of shared data and information that will benefit U.S. development programs like THAAD?

General O'NEILL. The U.S. technical benefits from the Arrow/ACES come from providing alternative technologies for risk reduction efforts on U.S. theater missile defense (TMD) programs. Arrow uses the identical focal plane array, manufactured by the same U.S. vendors as that of THAAD. Also, Arrow uses the same focal plane array materials as the Navy Standard Missile II Block IV A (SM–2 Block IV/A). Arrow provided flight data to the THAAD and the SM–2 Block IV/A programs. Other benefits for the U.S. TMD development programs include risk reduction data on hypersonic missile flight; lethality and kill assessment; target signatures for infrared and radio-frequency seekers; infrared signature prediction codes; booster stage separation at high velocities and dynamic pressure; and hypersonic flight performance of radomes in the endo-atmosphere.

It is in the U.S. national interest to support the development and deployment of the Arrow Missile System in order to provide for a robust missile defense capability in Israel. This system will contribute to the deterrence of future TBM conflicts in that region and has the potential to contribute to a more robust defensive response if deterrence fails. The potential interoperability of the Arrow System with U.S. systems would facilitate effective coordinated defense with U.S. systems deployed to the Middle East theater.

Senator LEVIN. If U.S. systems prove to be interoperable with the Arrow system, how would or could the U.S. cooperate with Israel on joint missile defense operations? Could each side provide the other with missile warning data? Are there other ways in which the systems would be interoperable?

General O'NEILL. *Autonomous Operations*—Even if two or more systems operate independently of the other in the same theater, Electro-Magnetic Interference (EMI) issues must be identified and mitigated. This is necessary to insure that each system can operate without interfering with the radars, communications, ground equipment, and weapons of other systems. A minimum level of non-interference interoperability must be attained if two systems are to operate without degrading the performance of each other.

Data Exchange—Integration of remote sensor track data from another system into TMD weapon systems offers significant benefits; improved launch point estimation, better impact point prediction, and cuing.

Engagement Planning—Improved inventory control can be attained through intelligent allocation of assets through pre-conflict engagement planning. It also creates a means to test the robustness of battle management logic.

[Whereupon, at 3:30 p.m., the committee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1997 AND THE FUTURE YEARS DEFENSE PROGRAM

FRIDAY, MARCH 29, 1996

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

ARMS CONTROL, COOPERATIVE THREAT REDUCTION PROGRAM AND CHEMICAL DEMILITARIZATION

The subcommittee met, pursuant to notice, at 11:05 a.m., in room SR–232A, Russell Senate Office Building, Senator Trent Lott (chairman of the subcommittee) presiding.

Present: Senators Thurmond, Warner, Lott, Nunn, Exon, Levin, and Bingaman.

Committee staff members present: Romie L. Brownlee, staff director and George W. Lauffer, deputy staff director.

Professional staff members present: Lucia M. Chavez, Jonathan L. Etherton and Eric H. Thoemmes.

Minority staff members present: William E. Hoehn, Jr., professional staff member and DeNeige Watson, professional staff member.

Staff assistants present: John R. McLeod and Franklin H. Turner.

Committee members' assistants present: Judith A. Ansley, assistant to Senator Warner; Andrew W. Johnson, assistant to Senator Exon; and David A. Lewis, assistant to Senator Levin.

OPENING STATEMENT OF SENATOR TRENT LOTT, CHAIRMAN

Senator LOTT. The subcommittee will come to order.

The subcommittee meets today to receive testimony on the fiscal year 1997 budget request for arms control implementation, the Cooperative Threat Reduction Program, and the Chemical Demilitarization Program. I will keep my comments brief so that we can get right to the witnesses' testimony. However, I will say that there are concerns with how the administration has used the various arms control implementation commissions to change inspection obligations and overall implementation of the treaties. Additionally, there continue to be questions about the obligation rate of the Cooperative Threat Reduction Program, and whether CTR has really accomplished what it was set out to accomplish.

Last, with regard to the Chemical Demilitarization Program, as this subcommittee has expressed in previous years, we continue to have concerns about the cost growth of the program and delays in construction of the facilities. These issues are more important since the administration is pressing the Senate to ratify the Chemical Weapons Convention by the end of April. We need to make sure that we have all the answers we need before we move to ratify the CWC. These destruction facilities are critical to the United States' ability to fulfill its obligations under the CWC.

I want to welcome the witnesses today: Dr. Susan Koch, Deputy assistant Secretary of Defense for Threat Reduction Policy; Dr. Theodore Prociv, Deputy assistant for Chemical/Biological Matters to the assistant to the Secretary of Defense for the Atomic Energy Agency; and Dr. Kent Stansberry, Deputy Director for Arms Control and Compliance in the Office of Defense Acquisition and Technology.

In order to spend time in the question-and-answer portion of the hearing, I would ask that witnesses please keep their testimony to about 10 minutes each, if you can. If you will submit your full testimony, we will make sure that it is all made a part of the record.

Senator Exon, do you have an opening statement at this time?

Senator EXON. Mr. Chairman, I do. I have an opening question or two for you, if I might, to help, for the record, straighten out where we are going, how fast we are going, how well we are doing it, and what the plans are for the future.

I have had conversations from other minority members on the committee that we do not seem to be following exact proper procedures around here. Example number one is that on my direction sheet from staff that I get every day that I follow relentlessly, it says at 11 o'clock this morning—that is now—the Strategic Forces Subcommittee in SR–232A, open, hearing on arms control, Cooperative Threat Reduction Program and chemical demilitarization, witnesses to be determined.

Now, I appreciate very much the witnesses that are here. These are important witnesses. I do understand that the written testimony is now with us. I guess what I object to, Mr. Chairman, and I would like to have the majority take a look at these things, is why is it that we do not know the day before who the witnesses are going to be the next day? Was our staff just not informed, or were we not up to speed?

The second concern that I have is with regard to my responsibilities on the budget committee. Now, as I understand it, the plan of the majority on the armed services committee seems to be to have a markup in a rather hasty, speedy fashion, which I do not object to, except that evidently we are headed for a situation, from what I understand, the plan scheduled for the armed service committee and the plan scheduled for the budget committee, we will very likely be facing a markup on the budget committee before we have our bogey from the armed services committee.

It seems to me like that may be putting the cart before the horse, and it may get us into all kinds of logistic problems as we move on through. Could the chairman possibly enlighten me on the concern that I am expressing, not only for myself, but other members of the minority?

Senator LOTT. Well, I would be glad to respond. First of all, I think Senator Exon is aware and supportive of the idea that we move forward as expeditiously as we can this year, not only with our hearings, but with the markup, so that we can avoid the problem we got into last year and previous years, where we do not get our bill through until July or August or September, we get completely tangled up in the appropriations process and actually get kind of run over by the appropriator. So we were hoping to move forward this year a little faster than we did last year and get the markup done earlier.

I have not looked at the exact schedule of the budget committee, but I do believe we will be having the budget committee meetings as soon as we come back, starting in April with some hearings. I believe we are scheduled on the floor of the Senate for the next fiscal year budget in May. We want to get these hearings done so that we will be in a position to do an earlier markup and a better job of markup.

Last year, we probably should have had more communication than we did. We want to have the time and the ability to do that.

With regard to this particular hearing, we requested that DOD make witnesses available for this hearing a week ago. We do not specify who the witnesses are going to be. DOD has to make that decision. I am not being critical of the delay or the time it took for DOD to determine the proper and best witnesses for this hearing. The notices went out yesterday and we received DOD's testimony, yesterday afternoon. So that is kind of what is involved.

We are trying to move forward expeditiously with the hearings. I am sure the Department wants to make sure we get the right witnesses. We will try very hard to get the notices out earlier and try to get the witnesses identified earlier so the members can have a chance to review the testimony.

Senator EXON. Mr. Chairman, thank you very much for that explanation. That is somewhat helpful. I would just emphasize, can you answer the other part of the question that I asked? I took it from your statement, then, that we are not going to move to markup until we have the mark from the budget committee on armed services?

Senator LOTT. I am not really sure about that. I think I would have to consult with the chairman on that and on the schedule. I think part of it depends on when the budget committee meets and when it acts. The budget committee, under our rules, I believe is supposed to have its work done by April 15th.

Senator EXON. Well, we are obviously not going to meet that.

Senator LOTT. So I just have to wonder how long should we delay, waiting on the budget committee. But I do not know the answer to that. If the budget committee acts, I think, late in April, then we will be able to move forward.

Senator EXON. Well, originally, the budget committee was to expedite its procedure also. Then, for reasons that I am not fully familiar with, that seemed to have fallen by the wayside. The ranking member of the minority in the armed services committee just entered the room, and I would simply say to Senator Nunn that I was raising some concerns that I have received from other members on the minority with regard to the procedures that are being followed, and I guess there is concern on our side that we may—I certainly agree we should not let the appropriators run over us. That has been a concern that we have had regardless of who was in the majority.

Senator LOTT. Right.

Senator EXON. I did not like the situation, and share your concerns, over what we did not do properly last year. Nevertheless, I think these hearings have to follow the usual procedures. I guess I will certainly criticize the administration if they were late in getting these names up to us. But when I have a sheet, as I read it to you, where we are going to have a hearing today and, as of yesterday, the witnesses were to be determined sometime later, that is pretty late.

I have a major concern with regard to the procedures here, though, and what we procedurally might run into on the floor if we, as the armed services committee, get ahead of the budget committee and ignore or move ahead previous to any figures we receive from the budget committee. I have not had a chance to discuss this in detail with Senator Nunn, but I would be interested in what his thoughts are on this.

Senator LOTT. Well, I might say again, that call will be made by the chairman and the ranking member, after consultation with all of us. But you may want to discuss it with Senator Thurmond or with Senator Domenici. My attitude is, as a member of both the budget committee and the armed services committee, if the budget committee moves forward in a timely fashion, fine. If they do not, I personally am not inclined to wait on them.

I think that is one of the problems of the Senate around here: everything is pushed off until June, July, September, or October. I think we ought to all get going.

Senator NUNN. Mr. Chairman, if I could just say a word in response to Senator Exon. I have not talked to Senator Thurmond in any kind of detail, but just very preliminary discussions have indicated that what he would plan to do was hopefully get a budget resolution. But if that is not coming in a timely fashion, that he would use last year's budget resolution, which had numbers in it for this year. Then if the budget resolution numbers for this year are different than what was indicated in the budget resolution for last year, we would adjust.

We have always tried to have the authorization bill within the budget ceiling, although, in the Senate, it is not required. In the House it is. It is the appropriation number that is required in the Senate. The authorization bill is not technically subject to the budget ceiling, but we become irrelevant if we do not meet that ceiling. If we are going to be of help to the appropriators and give them such basic guidance as we choose to do, then it is best to adjust.

So I think, right now, without trying to announce anything for Senator Thurmond, I believe that his indication would be he plans to move forward with our schedule, and adjust it as we go along.

To the people on the budget committee, Senator Exon, and as a former member, I can say that—when you talk about getting ahead of the budget committee—my experience is the budget committee is not hard to get ahead of. [Laughter.]

Senator NUNN. Because you all have a very difficult time getting agreement. I understand that as a member.

Senator LOTT. One other thing I might note. We are also trying this year to communicate with our House counterparts and urge that we, as much as possible, be working off the same numbers. I remember last year they had higher numbers than we did, and it made the job of merging the two even more difficult. So we are trying to have a communication to try to make that happen.

Senator EXON. Mr. Chairman, thank you very much. I have a very brief opening statement that I would like to make.

I am very pleased that the subcommittee is holding this hearing today, because it certainly is one of the most important subjects we have to wrestle with. I am particularly pleased that we will have the opportunity to focus our attention on the Nunn-Lugar program, also known as the DOD's comprehensive threat reduction, or CTR, program.

I have visited the former Soviet Union several times, and have seen some of the sites where the CTR program is hard at work. The progress being made under this project is truly impressive, in my view. I fully support Senator Nunn's efforts in this endeavor, through which we are really maximizing our defense dollars. By spending comparatively very little of our taxpayers' money, we are contributing tremendously, in my view, to the international stability and to the overall security of our homeland, which is our primary goal, of course.

In this time of talk about the need for development and deployment of expensive ballistic missile defense systems, let us not overlook this relatively inexpensive program that is having such a positive impact on our defense.

In this regard, I believe we should fully support DOD's budget request for the CTR program, and perhaps even look at ways, on down the line, where we could augment certain programs that have demonstrated real success in areas where there remains much more work to be done.

I would also like to thank our witnesses for braving this chilly morning, and thank you for being here.

Thank you, Mr. Chairman.

Senator LOTT. Senator Nunn, would you like to make an opening statement?

Senator NUNN. Mr. Chairman, I know that you are ready to get started here. I have a statement here I would like to put in the record. I will just do that and then just reserve time for questions. But I have just completed four hearings, Senator Roth and I have, in the Permanent Subcommittee on Investigations of Government Affairs Committee on the whole question of the nuclear, chemical and biological threat, not focusing strictly on this CTR program, but focusing more broadly on the threat to the United States.

I hope that members will have a chance to get their staffs to give them a summary of those hearings. We will be putting out a summary. But there is no question that, number one, we have some momentum that is really building with the CTR program, and I think we will hear from that, as well as the lab-to-lab program which is a spinoff of this in the Department of Energy.

So momentum is building, but it is also true that the threat, according to all our evidence, is growing faster than the momentum because of the economic deterioration in parts of the Former Soviet Union and because of the increased likelihood of nuclear material, chemical and biological material leaking out and getting into the wrong hands. An attack on the United States with chemical and biological, is deemed by most experts, more likely and nuclear less likely, but possible. It is something we really need to beef up our preparation for in this country, because we truly are not prepared for that here.

It is particularly revealing that our local governments are not prepared—fire departments, police departments—if we had something like what happened in the Tokyo subway system. We have a long way to go. So that is not directly the subject of the hearing today, but all of it goes together. The CTR program, being one of the subjects here, is very much on the front lines.

So it is certainly my hope that whatever problems are discovered in this program, we can constructively work to fix. I am sure that improvements can be made. We do not know how long this window of opportunity is going to be available—hopefully for a long time—but while it is, it seems to me that we certainly should move forward.

Senator LOTT. Senator Bingaman, do you have any comments?

Senator BINGAMAN. I have no statement, Mr. Chairman.

Senator LOTT. All right. Well, let us get started with the hearing then. Dr. Koch, would you please go first.

STATEMENT OF SUSAN KOCH, PH.D., DEPUTY ASSISTANT SECRETARY OF DEFENSE, THREAT REDUCTION POLICY

Dr. KOCH. Thank you, Mr. Chairman.

Reducing the dangers of weapons of mass destruction is, of course, one of our top Defense Department priorities. Arms control and the Cooperative Threat Reduction "Nunn-Lugar" effort are key elements in our overall approach to reducing the weapons of mass destruction danger. We are, of course, engaged in a full range of arms control activities with the states of the former Soviet Union. But this morning I would just like to concentrate briefly on the very successful story of the implementation of the START I Treaty.

Senator LOTT. Dr. Koch, would you pull your microphone just down a little and a little closer so we can hear you? Thank you.

Dr. KOCH. This is better, I hope.

START I, of course, just entered into force approximately 16 months ago, but is very well ahead of schedule on reaching its goals. The primary goals being an overall 40-percent reduction in strategic nuclear forces on both sides and the denuclearization of Ukraine, Belarus and Kazakhstan.

As of today, some 760 strategic ballistic missiles and heavy bombers have been eliminated throughout the former Soviet Union, particularly in Russia. All warheads, nuclear warheads, have been removed from Kazakhstan. We expect the remaining warheads to be removed from Ukraine and Belarus this year. The elimination of strategic delivery systems in all three states is going well.

The Treaty does, of course, feature a very highly complex and intrusive verification regime that leads inevitably to complexities in the implementation of the Treaty. The Joint Compliance and Inspection Commission is hard at work discussing any implementation issues, agreeing on practical measures to resolve them. Again, that process is going well and we have been briefing committee staff periodically on the Commission's activities, and of course we will continue to do so.

The next major nuclear arms control goal is the entry into force of the START II agreement, which will reduce strategic forces to just one-third of pre-START levels. Now that the Senate has consented to ratification, we hope that the Russian Parliament will follow suit without undue delay.

When the Treaty enters into force, we hope to agree with Russia on ways in which we could deactivate our strategic nuclear forces to be eliminated under the Treaty in advance of the strict Treaty requirements. But that is an effort that would require careful coordination between the two parties. Of course, our policy will be to maintain our strategic forces at START I levels until START II enters into force.

The other essential tool in our arms reduction and nonproliferation effort with the former Soviet Union is, of course, the Cooperative Threat Reduction Program. The threats facing us in the post-Cold War era are very different from those that faced us before, but still very, very real. Many are being dealt with very successfully. I would cite our success in the denuclearization of Ukraine, Belarus and Kazakhstan and the accelerated implementation of START I reductions.

But much more remains to be done: In Russia, still having most of the Soviet arsenal and manufacturing technical support infrastructure; Ukraine, significant missile manufacturing expertise; Kazakhstan, some remaining SS–18's and supporting infrastructure, a former biological weapons facility, extensive test facilities for weapons of mass destruction.

The three general areas of the program are to assist the destruction and dismantlement of weapons of mass destruction, to provide for protection, control and accounting of nuclear weapons, the safe storage of fissile material resulting from the dismantlement of nuclear weapons, and, in general, what we call chain of custody—ensuring safety and security throughout the process, from the time a warhead is removed from its missile, transported to a dismantlement site, and then the fissile material is safely disposed of.

Mr. Chairman, you mentioned there have been concerns in the slowness of the implementation of the program. I am happy to report that I think those concerns, while quite relevant for the past, no longer apply. Obligation rates have increased dramatically. We have notified 1.2 billion in funds thus far, of which almost 1 billion has been obligated. It did take time to work with our partners on developing and implementing in very precise, concrete fashion such an unprecedented program.

But we in the Department of Defense have learned well, our partners have learned well, and there is indeed a true momentum. In the program, success is breeding success as initial cooperative projects, in turn, generate others, through a habit of cooperation, through our both learning what more is needed.

I would cite two examples in this regard. One is our program on weapons protection, control and accounting. This started early on with comparatively simple cooperative projects, like the provision of armored blankets to ensure safe transport of weapons, particularly in their transport to Russia from Ukraine, Belarus, and Kazakhstan. That program is developing over time, so that we now have true efforts to ensure the continued security and safety of weapons in storage in Russia itself, in connection with their dismantlement, and extending to things like cooperation on personal reliability programs.

Another example of momentum is Project Sapphire from a year ago. Kazakhstan came to us to ask for help with disposing of 600 kilograms of highly enriched uranium. It came to us largely because of the habits of cooperation that had been built up over the previous few years. We had established trust. We had established confidence. We had established a record of being able to assist, being able to deliver. Of course, Project Sapphire was an extremely successful undertaking. I submit it would not have happened without the Cooperative Threat Reduction effort.

For fiscal year 1996, we will soon be advising the committee of our precise plans. We have requested 328 million for fiscal year 1997, of which the majority would go to destruction and dismantlement of weapons of mass destruction. Another major effort, chain of custody, weapons protection, control and accounting, and safe and secure storage of fissile material. Again, to sum, in both arms control and CTR, very much has been accomplished, very much remains to be done, and we appreciate the committee's support in these important tasks.

[The prepared statement of Dr. Koch follows:]

PREPARED STATEMENT BY DR. SUSAN J. KOCH

INTRODUCTION

Thank you for the opportunity to appear today. As Secretary Perry has often stated, reducing the dangers of weapons of mass destruction remains at the top of Department of Defense priorities. Our approach in this area follows two essential tracks. First, the United States is party to a number of formal arms control agreements with states of the former Soviet Union (FSU) or the former Warsaw Pact relating to nuclear and non-nuclear armaments. While many of these treaties originated during the Cold War era, they remain essential in providing legally binding obligations to reduce (and in some cases eliminate) categories of arms, as well as to enhance confidence and international stability. The other critical touchstone of our preventive approach in this area is the Nunn-Lugar Cooperative Threat Reduction (CTR) program. The accomplishments of this program have been substantial since its inception in December 1991. DOD's Threat Reduction Policy organization, which I lead, is responsible for integrating these two key elements—CTR and arms control with the FSU—of what Secretary Perry has called "defense by other means". Today I would like to begin with a status review of the principal arms control activities in my area and then provide a report on accomplishments of the CTR program.

ARMS CONTROL ACTIVITIES

Let me start by looking at our ongoing efforts related to **nuclear arms control** agreements, the first of my major responsibilities.

The Strategic Arms Reduction Treaty (**START I**) was signed in 1991 and entered into force in December 1994. This landmark treaty was originally concluded between the United States and the Soviet Union, and provided for the first actual reductions in deployed strategic offensive arms of the superpowers. Following the December 1991 breakup of the Soviet Union, Russia, Belarus, Kazakstan, and Ukraine became parties with the United States to the START I Treaty through the Lisbon Protocol. In documents associated with the signing of the Lisbon Protocol in May

1992, Belarus, Kazakstan, and Ukraine agreed to eliminate all strategic offensive arms from their territories within the START 7-year reductions period and to accede to the Nuclear Non-Proliferation Treaty (NPT) as non-nuclear weapon states. On December 5, 1994, Ukraine formally acceded to the NPT, as Kazakstan and Belarus had previously done, and the five START I parties then exchanged instruments of ratification, bringing START I into force.

START I requires the sides to reduce by December 2001 their deployed accountable strategic warheads by over 40 percent, and their accountable strategic delivery systems by about one-third, from 1990 levels. Efforts had begun to achieve these goals well ahead of entry into force of the Treaty. Currently, some 760 strategic missile launchers and heavy bombers have been eliminated throughout the FSU, with over 700 of these having taken place in Russia. On our part, the United States has deactivated all strategic missile launchers and bombers and destroyed about 60 percent of these delivery vehicles to be eliminated under START I. Both sides are already well below the first phase limits on delivery vehicles and accountable warheads set for December 1997. All nuclear warheads have been removed from Kazakstan, and we expect remaining warheads to be removed from Ukraine and Belarus this year. Elimination of strategic delivery systems from Belarus and Kazakstan is proceeding well, and such dismantlements in Ukraine are now underway. In short, the parties' record in implementing START I reductions is truly a success story.

START I incorporates a highly complex and intrusive verification regime. In addition to verification by national technical means, data notifications, missile flight test telemetry exchanges, and other cooperative measures, the Treaty provides for 12 types of on-site inspections and exhibitions as well as continuous on-site monitoring activities at specified facilities. START's Joint Compliance and Inspection Commission (JCIC), convened periodically in Geneva, provides a forum for the five START parties to discuss issues relating to compliance with Treaty obligations and to agree on practical measures to improve the Treaty's viability and effectiveness. TRP representatives have played key roles in all meetings of the JCIC. Beginning in March 1995, the Treaty parties began conducting on-site inspections at a large number of current and former strategic installations in the United States and former Soviet Union. As a result of these intensive activities, the sides have raised numerous issues related to inspection procedures and Treaty interpretation which continue under discussion in Geneva and through diplomatic channels. Committee staff has been briefed periodically on developments in this area.

The START I Treaty set the stage for the subsequent **START II** agreement between Russia and the United States further reducing strategic offensive arms. This Treaty, signed in January 1993, provides for the elimination, by January 1, 2003, of the most destabilizing category of strategic weapons—heavy and all other MIRVed ICBMs—and will result in the reduction of deployed strategic warheads to no more than 3,000–3,500 on each side, approximately one-third of pre-START levels. With the Senate's consent to ratification of START II having been approved, the administration hopes the Russian parliament will soon follow suit, allowing the Treaty to enter into force. At that time the parties will proceed to deactivate strategic systems to be reduced under the Treaty according to the agreement between President Clinton and President Yeltsin in September 1994. Threat Reduction Policy officials will take a lead role in establishing the schedule and method used for implementing these strategic force deactivations after START II enters into force. It is our policy, as part of our lead and hedge strategy developed during the Nuclear Posture Review, that until START II is ratified by Russia and entered into force, we will draw down and maintain our strategic forces at warhead levels consistent with START I.

The Treaty on Eliminating Intermediate-Range and Shorter Range Missiles (INF) was signed by the United States and the Soviet Union in 1987 and entered into force in 1988. It required the elimination of the sides ground-launched missiles with ranges between 500 and 5,500 kilometers; all such declared missiles were eliminated by mid-1991. The INF Treaty is of unlimited duration, prohibiting production and possession of missiles subject to its terms. Its inspection regime, consisting of short-notice inspections at former INF facilities and continuous portal monitoring of certain missile production facilities, remains in force. Representatives of my organization take part in the INF Special Verification Commission (SVC) at which the United States, Russia, Belarus, Kazakstan, and Ukraine meet to discuss and resolve Treaty implementation and compliance issues. DOD experts have been heavily involved in negotiations with the Russian Federation concerning procedures for continuous monitoring of new ballistic missile production at the Votkinsk Machine Building Plant. These discussions are continuing.

One example of adapting Treaty implementation to changing conditions is the U.S. policy on reimbursement of inspection costs in Belarus, Kazakstan, and Ukraine. Both the INF and START Treaties require that most inspection costs (other than continuous monitoring) be borne by the inspected party. This assumed that the parties—the United States and Soviet Union at the time—would conduct an equal number of inspections, and therefore the costs would balance out. However, Belarus, Kazakstan, and Ukraine saw this as placing an unfair burden on them. They told us that they planned to conduct few, if any, inspections of U.S. facilities, and they should not have to bear the cost of U.S. inspections in their countries. The U.S., while unwilling to change the INF and START Treaty provisions, addressed this concern by offering, as a matter of policy and not as a legal requirement, to reimburse them for the costs they paid for hosting U.S. inspections. We agreed to do so if, during any 6 month Treaty period, these states did not exercise their rights to inspect U.S. installations.

Congress was informed of this approach in the spring of 1994. Long-term INF policy statements were exchanged in May 1994 and START policy statements were exchanged in February 1995. OSD has, pursuant to the requirements outlined in the Defense Appropriations Conference Report for FY 95, notified key congressional staff prior to each reimbursement payment to Belarus, Kazakstan, or Ukraine.

We are also engaged with FSU countries on a broad range of **non-nuclear arms control** issues.

Overall, the Conventional Armed Forces in Europe (**CFE**) Treaty has been a resounding success. During the 3-year reductions period, CFE states destroyed or converted to other permitted uses over 50,000 items of TLE, including over 11,600 by Russia alone. Some 2,300 intrusive on-site inspections have been carried out. We also have been working, both multilaterally and in bilateral channels, to resolve the flank issue raised by Russia and, to a lesser extent, Ukraine in a manner that preserves the Treaty and would be acceptable to all 30 CFE states. We are working especially closely with our NATO allies on this, and while issues remain with Russia, I believe we have substantially narrowed our differences over the past several months.

On **ABM–TMD** demarcation, in the current round of the SCC we have focused on developing an agreement to implement the May 1995 summit joint statement on demarcation principles issued by Presidents Clinton and Yeltsin. The summit statement reaffirmed the United States and Russian commitment to the ABM Treaty, but allowed that both sides must be able to deploy effective TMD which do not pose a realistic threat to the other side's strategic nuclear force and are not tested for that capability. Our agreed framework approach to implementing these principles has two phases. In Part 1, the sides would agree that lower-velocity TMD systems—those with interceptor velocities up to 3 km/sec—comply with the Treaty as long as they are not tested against ballistic missiles with more than 3,500 km range or 5 km/sec velocity. Systems with higher interceptor velocities, including space-based TMD and TMD based on Other Physical Principles (OPP), would be addressed separately in Part 11; however, we have made it clear to the Russians that we will make unilateral compliance determinations under the ABM Treaty while we undertake discussions on high velocity systems. Although at the moment it is difficult to assess the prospects for closure on demarcation, we are clear in our commitment to both the ABM Treaty and effective TMD—we believe these two are consistent. *The United States will not accept a demarcation agreement that limits our ability to field effective TMD systems.*

We have also been engaged in a high-level dialog with Russia on resolving **bilateral CW** issues; these include differences over data provided under the Wyoming MOU, and the U.S. desire to move forward with implementation of the Bilateral Destruction Agreement.

Finally, we are working within the framework of the **United States-United Kingdom-Russian Trilateral Statement on BW** of September 1992 to implement the next step in this confidence building effort, which is to begin visits to military biological facilities. Again, this issue is receiving high-level attention, since the visits would be an important element in our effort to ensure that Russia has terminated the offensive BW program it inherited from the Soviet Union.

COOPERATIVE THREAT REDUCTION

I would now like to turn to a detailed discussion of issues related to the **CTR program.**

While the progress I have described in the arms control area is encouraging, the political and economic conditions which have followed the disintegration of the Soviet Union in 1991 have raised a number of concerns regarding the ability of its four nuclear successor states to meet treaty commitments on time and maintain effective control over of nuclear and other weapons of mass destruction (WMD) and related materials. Russia, as the inheritor of most of the Soviet nuclear arsenal, possesses more manufacturing and technical support infrastructure for WMD than any other successor state. Ukraine, which still has approximately 300 nuclear warheads (although we expect these to be fully withdrawn in the coming months) and more than one hundred ICBMs on its territory, possesses significant missile manufacturing expertise. Kazakstan, which no longer has nuclear warheads on its soil, still hosts some SS–18s and their supporting infrastructure, as well as a former biological weapons facility and Soviet-era WMD test facilities at Baikonur, Degelen Mountain, Semipalatinsk, and Sary-Shagan. Belarus still has on its territory a small number of modem mobile SS–25s with supporting infrastructure.

It is in the interests of all involved: Russia, Ukraine, Belarus, Kazakstan, the United States, and, indeed, the world, to work together to ensure that treaty commitments are met, and effective controls maintained. U.S. expertise, experience, and capability have an important role to play in guaranteeing this common goal. Secretary Perry has described our relationship with Russia as a "pragmatic partnership" in which the two countries seek to cooperate where our interests intersect and avoid the Cold War's reflexive antagonism where our 'interests diverge, even as the U.S. maintains an adequate defense as a "hedge" against failure of Russian reform. Our continued safety from WMD is among the clearest of our pragmatic common goals and an area in which we have had great success in cooperatively reducing the threat.

In reaction to the new challenges posed by the post-Cold War world, and through the visionary leadership of Senators Sam Nunn and Richard Lugar, Congress mandated the establishment of the Cooperative Threat Reduction (CTR) program in fiscal year 1992 with three objectives:

- Assist the recipient states in destroying nuclear, chemical, and other weapons of mass destruction;
- Assist those states to transport, store, disable, and safeguard weapons in connection with their destruction; and
- Establish verifiable safeguards against the proliferation of such weapons.

In fiscal year 1993, authorization was broadened to include:

- Preventing diversion of weapons-related scientific expertise;
- Facilitating demilitarization of defense industries and conversion of military capabilities and technologies;
- Establishing science and technology centers; and
- Expanding military-to-military and defense contacts between the United States and the recipient states.

Through the CTR program, the United States has provided assistance in the form of equipment, services, and technical advice to Russia, Belarus, Kazakstan, and Ukraine. The bulk of this assistance is implemented by the U.S. Department of Defense. This makes a great deal of sense, for this program is truly at the heart of, as Secretary Perry has called it, "defense by other means." For a bargain price, we are able to increase our safety—a safety that was in previous years bought at far more expensive rates, through the purchase of weapons systems to match and surpass those of the Soviet Union. We did well at that and we were successful—but it was costly. Through CTR assistance, we attack the threat at its root—by helping to dismantle and consolidate former Soviet weapons, and we thus ensure that the requirements of the hard-won treaties negotiated in recent years are met.

CTR is also "defense by other means" on the front lines of ensuring adequate controls. The CTR program is working in all four countries to reduce the threat of theft and/or diversion of these WMD and associated materials through support for safe and secure removal of nuclear warheads to Russia, destruction of WMD and related infrastructure, safe storage of warheads destined for destruction and of the fissile material removed from them. In all, we can divide the programs funded by CTR into three general categories:

- WMD destruction and dismantlement;
- Weapons protection, control and accounting, fissile material storage, and other chain of custody;
- Demilitarization.

The CTR program has notified over $1.2B to Congress for use in Russia, Belarus, Kazakstan, and Ukraine. The fiscal year 1996 notification, currently being staffed, will bring that total to $1.5B. More than $985M has been obligated for this program, and our spending rates have increased steadily since the program's inception in fiscal year 1992. Early in the program, there was widespread criticism of CTR for its slow obligation rates. Indeed, it took time for both ourselves and our Russian, Ukrainian, Belarusian, and Kazakstani colleagues to define the assistance, sign the necessary agreements, and begin the work. It is a complicated process, but we have learned a great deal from our experience. We better understand the challenges of doing business in countries undergoing a transition from communism to capitalism. The projects funded by CTR are, for the most part, now moving smoothly. Kazakstan is free of nuclear warheads and Ukraine and Belarus are on their way. This is the ultimate yardstick for how much we have learned, and how well we are doing.

Progress does not equal victory, however—not yet. CTR has much work left to do. Today, I will endeavor to describe some of what we have accomplished and some of what we propose for the future. I am sure that you will agree with me that this work remains just as important today as it was when first conceived, 5 years ago. We must continue to build on this foundation, for what we are building is safety and security for our children and our grandchildren.

Destruction and Dismantlement

Our **Strategic Offensive Arms Elimination (SOAE) and Strategic Nuclear Arms Elimination (SNAE)** programs in Russia, Belarus, and Kazakstan, and Ukraine, and **Nuclear** and **WMD Infrastructure Elimination** programs in Kazakstan and Ukraine provide the recipient states with equipment, training, services, logistic support, and other assistance for expediting the elimination of strategic offensive arms pursuant to the START treaties and facilities or infrastructure previously supporting WMD.

Ukraine

Destruction and Dismantlement includes, among other things, assistance to eliminate all SS–19 silo launchers and launch control silos in **Ukraine** (Secretary Perry and Ministers of Defense Grachev and Shmarov watched the final step in the destruction of the first Ukrainian silo eliminated with CTR funding). With CTR assistance, a liquid rocket fuel storage facility critical to defueling SS–19 missiles in Ukraine was put into use last November and a missile neutralization facility in Ukraine will be up and running this Spring. On base propellant transfer facilities and nuclear storage structures will also be decontaminated and dismantled.

Kazakstan

Through CTR, DOD is assisting **Kazakstan** in the safe elimination and clean up of all **SS–18** silo launchers and launch control sites, training silos, and silo test launchers as well as **bomber** dismantlement and the elimination of infrastructure associated with nuclear weapons test tunnels at **Degelen Mountain,** as well as on base propellant transfer facilities and nuclear storage structures. This year we will begin a USG project to be spearheaded by CTR to eliminate biological weapons production infrastructure at a former Soviet biological weapons facility, Biopreparat, in Kazakstan.

Belarus

In **Belarus,** assistance will be used, in part, to facilitate elimination of fixed structures associated with the **SS–25** mobile intercontinental ballistic missiles and to dispose of approximately 10,000 metric tons of liquid fuel and oxidizer.

Belarus, Kazakstan, and Ukraine

Even as CTR supports START-compliant dismantlement, the **Communications Links** supported by this program in **Belarus, Kazakstan, and Ukraine** enable these countries independently to fulfill reporting requirements under START and other arms control treaties.

Russia

In **Russia, SOAE assistance** includes SSBN, bomber, and silo launcher dismantlement and provision of additional liquid freight intermodal containers to assist with fuel and oxidizer storage following defueling of liquid propellant missiles. This year, we will begin our SS–18 missile and solid propellant ICBM/SLBM elimination project.

The USG is also helping and encouraging Russia to ratify the Chemical Weapons Convention (CWC), and to eliminate their stockpiles. We intend to provide assistance in the form of equipment, services and training for the creation of a **CW destruction** facility to destroy artillery munitions with organophosphorous agent. A joint United States-Russian technical evaluation closely examined the Russian two-stage chemical agent destruction process, and validated its effectiveness. Laboratory facilities are being upgraded to allow development of analytical methods for monitoring during destruction operations. Three mobile labs will be delivered this summer.

How well is this working? You can judge for yourselves. The 430 ICBM launchers, 252 submarine launchers, and 36 bombers have been eliminated in Russia and 80 ICBM launchers have been eliminated in Kazakstan. We are just getting started in Ukraine, but expect to assist in the elimination of all 176 ICBM silos by the time our work there comes to an end. Did CTR assistance do this alone? No. It is the cooperation, the pragmatic partnerships between ourselves and these countries that enable this steady movement to final success.

Chain of Custody

Chain of Custody programs provide assistance to enhance security of nuclear weapons and weapons material during storage and transport to dismantlement and storage sites—at every "link" along the custody "chain". While complete assembled nuclear weapons are less prone to theft or diversion than stocks of fissile material or components, they are vulnerable nonetheless and the consequences of their falling into the wrong hands could be catastrophic. To support the safety and security of assembled weapons under MoD control, the DOD has developed a cooperative program with the 12th Main Directorate of the Russian MoD. The CTR assistance provided under the DOD–MoD Cooperative Nuclear Weapons Security Program for improving nuclear weapons transportation security and storage security focuses on maintaining a high level of security during shipment and storage of Russian nuclear weapons in connection with their dismantlement. This program has been marked by excellent DOD–MoD cooperation and swift implementation; within 4 months of the first discussions and within one month of signing the CTR Implementing Agreements, actions to procure material had started.

Storage and Transportation Security

Specifically, CTR has provided Russia with armored blankets to enhance weapons security during transport. We have helped upgrade cargo and guard railcars for the same purpose. **Emergency Response Training/Equipment** has been provided to all four recipient states to enhance their capability to respond to accidents involving nuclear weapons in transit for dismantlement activities. Working with the Russian Ministry of Defense (MoD) we will help automate their nuclear stockpile inventory and provide computer models to assess storage site vulnerability as well as information about possible guard force training. We have been working with the Russian MoD to apply a systematic approach which will provide a coordinated security system at MoD sites.

Fissile Material Storage Facility

A high priority and high profile project is the fissile material storage facility at Mayak, near the formerly closed city of Chelyabinsk. This facility will protect fissile material resulting from dismantled weapons, providing a safe and secure location for it. The United States is willing to provide up to half the cost of the facility. Lack of adequate and appropriate storage space could cause two problems: first, this material would be stored in facilities more vulnerable to theft; and second, the Russians have stated that lack of storage space for the fissile material would create a warhead dismantlement bottleneck.

We have been disappointed with numerous delays in this project caused by a Russian change in the location and slow progress in the design development. DOD–MinAtom working relations have not been as positive and forthcoming as DOD's relations with the Russian MoD or State Committee on the Defense Industry. However we have recently seen progress. We believe the United States-set milestones for this program, announced last year, have been effective in generating forward movement. We are now pleased to report that cooperation on design has accelerated, construction is proceeding uninterrupted, an on-site Design and Construction Contractor was hired in early March 1996 and should be in place by April, along with the Army Corps of Engineers. Both sides have agreed that a Material Control and Accountability (MC&A) system will be designed and installed to help provide the United States with transparency.

Progress

We can talk of specific successes, specific progress, bringing up examples such as Project Sapphire, born of a 1994 private request from the Government of Kazakstan for U.S. assistance to safeguard nearly 600 kg of weapons-grade highly enriched uranium (HEU), some of it in the form of pure HEU metal, stored at a vulnerable site. The USG not only was able to meet the request, but provided an interagency assistance package. CTR provided funding both from our dismantlement and chain of custody budgets for this endeavor, in which, as in others we played ana continue to play a central role, Through this assistance, working alone or with other agencies, we help safeguard weapons and weapons materials all along their chain of custody.

But the greatest argument in favor of our weapons security programs is the successful and safe transfer of all warheads from Kazakstan to Russia and the upcoming parallels to that milestone in Ukraine and Belarus. As of last month, there were fewer than 500 warheads left on Ukrainian soil—scheduled to return to Russia in the coming months. Only 18 remained in Belarus. A combined total of 2883 warheads have been returned to Russia. Again, I have to reflect that it is not CTR alone that makes this happen, but we feel certain that it is CTR that makes it possible.

Demilitarization

Demilitarization programs include projects that aim to enable facilities, organizations, and individuals which had been involved in Weapons of Mass Destruction (WMD) related fields to pursue peaceful endeavors. Under this category, we include the **defense conversion** programs which provide assistance to convert former military enterprises in all four recipient states to the production of civilian goods. This is a relatively small investment, even among the bargains of the CTR program: $233 million out of $1.2 billion for CTR is programmed for defense conversion. CTR assistance is conceived as seed money to show the private sector that defense conversion partnerships can succeed, thereby stimulating greater private investment in defense conversion. We have also shifted away from direct assistance and now support defense conversion mainly through other mechanisms, leveraging capabilities of the entire U.S. Government and, more importantly, the private sector.

One such mechanism is the **Defense Enterprise Fund (DEF)**, an independent, not-for-profit U.S. corporation, initially funded by CTR grants, which assists in the conversion and privatization of excess military/industrial capacity through financial assistance for partnerships. By doing so, it helps to dismantle the ability to produce future WMD. The DEF has a unique mandate among the enterprise funds to focus explicitly on the WMD threat. The DEF received a total of $29.7 million in fiscal year 1994–1995. Unfortunately, Congress eliminated the DEF funding in the fiscal year 1996 CTR budget. In order to continue this effective nonproliferation tool, the State Department will request funding for the DEF in its fiscal year 1997 budget. After that point, the DEF is expected to be self-sustainable through raising private capital.

Some notable examples of our defense conversion success, using Russia as an example, include: **Istok State Scientific Production Enterprise**—a former manufacturer of electronics and communications equipment for space and military use—and Hearing Aids International are producing hearing aids for the Russian market; **State Scientific Research Institute of Aviation Systems (GosNIIAS)**—a leading institute for combat aircraft—and Rockwell are developing air traffic management hardware and software; and **Leninets Scientific Production Concern**—a former developer and producer of military aviation guidance and control systems—and International American Products are remanufacturing dental chairs and developing production lines for sterile packaging of dental equipment. On completion, these projects will have converted nearly 170,000 sq. ft. of factory space and approximately 500 former employees in WMD production. Complementing this, the DEF has made a $1.8M loan to Neramash, a joint venture of Caterpillar and Kirovsky Zavod in Russia to produce frames for excavators.

Defense and Military Contacts

Finally, CTR helps support Defense and Military Contacts with the Ministries of Defense of the recipient states. By building on each previous years' contacts, a network of professional exchanges is established that gives recipient state defense and military establishments a stake in continued good relations with the United States. Goals are to: encourage denuclearization in the case of Ukraine and Belarus and nonproliferation in the case of all four states; enhance stability by regular exchanges on defense strategy, and greater transparency in budgets and programs; encourage and assist the restructuring and downsizing of former Soviet defense establishments; address as far as possible the concerns of the militaries and encourage their support for democratic reforms; help militaries to better understand democratic societies, especially civil-military relationships; develop long-term institutional interfaces for substantive professional dialog on defense and military topics; encourage participation in the NATO Partnership for Peace Program; and increase understanding of defense establishments in the former Soviet Union.

Non-DOD Programs

Having discussed the CTR programs administered by DOD, let me now turn to some programs that are or have been funded by the CTR budget but which have been delegated to other agencies. These programs are important elements of our effort, but they fit better into the expertise and capabilities of other agencies, while DOD continues to do the work that we do best. For instance, on chain of custody, DOD programs for weapons protection, control and accounting complement that of the Material Protection, Control, and Accounting (MPC&A) effort in the new independent states to ensure that facilities storing and/or handling weapons-usable nuclear materials improve physical control over, access to, and accounting procedures for fissile materials. Initially managed by DOD, the MPC&A program is now managed by DOE for the U.S. Government. Similarly, the Export Control assistance program, formerly funded by CTR but now administered by the Departments of State, Commerce, Energy as well as the Customs Service, and the International Science Centers now appear in the State Department budget.

Fiscal Year 1997 Program

As you can see, we have both accomplished a great deal and have a great deal left to do. Since we began these efforts in fiscal year 1992, we have seen some programs completed, such as the provision of armored blankets to Russia, others have had funding responsibility delegated to other agencies, such as MPC&A. In still other cases, while the work continues, prior years funding permit completion of the specific project. The CTR program is currently planned to make its last request for new funds in fiscal year 2001. It was established to see certain goals accomplished, to enable us to see a safer world. Some of our needs have changed since the program was established. We have, over the years, much improved our planning, learning from difficulties experienced earlier. We now know not only where we are going, but also how to get there. We have developed plans for each of our projects. These plans are challenging, but feasible. Given adequate funding, we should meet our goals. Our plans for the fiscal year 1997 budget are in line with this approach. With this plan, we will continue projects that are ongoing, completing some of them in fiscal year 1997. We will begin new projects that were not ready earlier. Let me briefly lay out to you how we propose to allocate the $328M budget request for fiscal year 1997. This plan may be revised over the coming months as we seek to maximize the effectiveness of the CTR program.

For Dismantlement activities, $177.5M is requested in fiscal year 1997 funds. This includes $78.5M in additional funding for Chemical Weapons Destruction in Russia, a program which was reduced by Congress for fiscal year 1996 and must be funded in fiscal year 1997 to stay on track. It also includes funding for Strategic Offensive Arms Elimination (SOAE) in Russia, to help continue the projects now ongoing, including those that support START II—such as SS–18 missile and SS–24 rail mobile launcher elimination, as well as continued bomber and SLBM elimination. Finally, our Strategic Nuclear Arms Elimination and Weapons of Mass Destruction Infrastructure Elimination projects in Ukraine will require substantial funding in fiscal year 1997, including continued support for demobilization infrastructure elimination, and silo launcher elimination.

Complementing our dismantlement activities, a need will remain to ensure controls and safeguards over weapons and weapons materials. Our planning calls for **$119.5M in fiscal year 1997 for Chain of Custody** projects. Funding will support the Fissile Material Storage facility, acquisition of Fissile Material Containers, and Weapons Storage Security. By this time, we hope to move into the second stage of that program—support for creating an integrated warhead control system—which will involve a more methodical analysis of MoD's security posture to support MoD's longer range needs (new computer inventory system), additional warhead shipments (START II), and hopefully the development of an integrated systems approach to upgrade physical security at MoD's nuclear weapons storage sites.

Finally, our planning calls for an additional **$30.9M for Other Program Support,** which will include continued funding for the defense and military contacts program in all four countries, as well as covering our congressionally mandated audits and examinations and providing for various administrative and support costs.

CONCLUSION

I have given you today a description of an approach to threat reduction which, I believe, has paid remarkable dividends and promises to deliver even more tangibly in the future. Arms control and the DOD CTR program act synergistically to lessen the dangers of weapons of mass destruction in the former Soviet Union. In order to continue this vital work, we need sustained congressional support. Many important changes for good in the international climate have taken place in this decade, but many of the underlying concerns which justify our aggressive two-pronged approach remain. In particular, our CTR program has gained maturity and experience—we have a solid understanding of where we want to go, and what we need to get there. We also understand Congressional concerns. CTR funding was reduced

20 percent last year, and your message on defense conversion was heard—you will find it reflected in our long-term planning. But we also strongly believe that we are presented now with an historic opportunity. With successful implementation of key arms control agreements and a relatively small dollar investment in CTR programs with our former enemies, we can bring about great gains in our security and, without question, make the world a safer place. With your support, we will succeed.

Senator LOTT. Dr. Prociv.

STATEMENT OF THEODORE M. PROCIV, PH.D., DEPUTY ASSISTANT TO THE SECRETARY OF DEFENSE, NUCLEAR, CHEMICAL AND BIOLOGICAL DEFENSE PROGRAMS (CHEMICAL/BIOLOGICAL MATTERS)

Dr. PROCIV. Mr. Chairman, it is also my pleasure to testify before this committee on behalf of the Department of Defense, the DOD Chemical Demilitarization Program. We appreciate the committee's interest and support in this important congressionally mandated program.

With your permission, sir, my written testimony will be added to that of my colleagues and, with your concurrence, I will also make a few opening remarks.

In support of my testimony, I also have in the room Major General Wharton—right here behind me. Major General Wharton is the Program Manager for all of the chemical destruction activities in the Army. Major General-Retired Roland LaJoie, who handles the chemical destruction of the CTR program, as well as the other aspects of CTR. Again, with your permission, if I run into technical problems in answering some questions, I will rely on them to help me out.

The objective of our program is to destroy the U.S. inventory of lethal chemical agents and munitions and related non-stockpile materiel, and to provide for the emergency response capabilities associated with those. The fiscal year 1997 requested program supports international initiatives to rid the world of chemical weapons within the congressionally mandated destruction date of 2004.

Dr. Harold P. Smith, who is the Assistant Secretary of Defense for Nuclear and Chemical/Biological Defense Programs, and myself provide the OSD oversight to the program. In addition, I might add, we also manage the chemical defense and the protective aspects of the CB program.

The executive agent for this program is the United States Army. This is conducted under the management and oversight of Mr. Gill Decker, who is the Under Secretary of the Army for Research, Development and Acquisition. Maj. Gen. Robert Wharton, as I mentioned, is the Program Manager.

In recognition of this inherently complex and important program, both the Department and the Army agree to designate the Chemical Demilitarization Program as a major defense acquisition program, sometimes called and MDAP. As an MDAP, it enjoys the same management scrutiny reserved for the Department's most complex acquisition programs. We are currently addressing the complex issues of cost and schedule, while maintaining a safe, environmentally sound program, and responding to congressional direction.

There are four major components to the program, and I will discuss each of those today. The Chemical Stockpile Disposal Project is the one that destroys the U.S.'s unitary chemical stockpile within the 8 sites in the continental United States and at Johnston Atoll.

The Chemical Stockpile Emergency Preparedness Program is a complementary effort to the disposal program that helps to enhance the protection in the civilian population around those areas where we are putting up destruction sites.

The Non-Stockpile Chemical Materiel Project plans for the destruction of existing recovered chemical warfare materiel and that which may be received from burial sites. It also will destroy the binary munitions, related components, miscellaneous chemical warfare materiel, and some of the former chemical weapons production facilities.

The Alternative Technologies and Approaches Program, the fourth part of this, is a project that explores and evaluates alternative technological approaches to the Army's baseline program. The baseline program, as you know, is a reverse assembly and incineration. We are looking at any opportunities that we might have to do this in a more efficient manner.

Significant progress in our program has been made. The Johnston Atoll chemical disposal system, JCADS, has demonstrated full-scale disposal operations in compliance with safety and environmental requirements for over 4 years of operational testing. We have successfully destroyed over 1,000 tons of agent there. Lessons learned from JCADS operation are being used to enhance the environmental compliance, safety and operational efficiency of all the future destruction plants.

Construction of the Tooele Chemical Plant Disposal Facility is complete. This first continental U.S. facility has been built and contains approximately 42 percent of the stockpile. Agent destruction operations are scheduled to start in the third quarter of this fiscal year.

A contract for construction of the operation at Anniston Chemical Agent Disposal Facility in Alabama was recently awarded under a FAR regulation called Limited Notice to Proceed. The winner of that award was the Westinghouse Electric Company.

Our fiscal year 1997 budget request contains approximately 800 million. Of this amount, approximately 49 million is for research and development and testing support, 247 million for procurement requirements, and 478 million for operations and maintenance. In addition, we are requesting 132 million in the military construction account. The fiscal year 1997 budget provides full funding for this program to meet the congressional directed 2004 completion date.

In summary, I would like to emphasize that we in the Department share the same goal as the Congress: to safely destroy the chemical weapons stockpile, while providing maximum protection to the public, the work force and the environment. We appreciate the support and interest of the Congress for this program to accomplish this mutual goal. Our focus must continue to emphasize completing this critical mission of disposing the Nation's stockpile chemical warfare material.

That concludes my testimony. Thank you very much.

[The prepared statement of Dr. Prociv follows:]

PREPARED STATEMENT BY DR. THEODORE M. PROCIV

Mr. Chairman and Members of the committee: thank you for this opportunity to discuss the Department of Defense chemical demilitarization program. I appreciate the committee's interest and support in this important congressionally mandated program. The objective of the chemical demilitarization program is to destroy the U.S. inventory of lethal chemical agents and munitions and related (non-stockpile) materiel. In addition, to provide for emergency response capabilities; while avoiding future risks and costs associated with the continued storage of chemical warfare materiel. Our requested program supports international initiatives to rid the world of chemical weapons, and the congressionally mandated destruction date of 2004.

The responsibility for OSD oversight of this program resides with Dr. Harold P. Smith Jr., the Assistant Secretary of Defense for Nuclear, and Chemical and Biological Defense Programs; who in turn delegated oversight responsibilities to me, the Deputy Assistant for Chemical and Biological Matters. The Department of Defense recognizes that the inherent complexity and large size of the chemical demilitarization program requires an intensive management approach. We are all committed to insure safety, security, cost effectiveness, and timely completion of the destruction effort. In recognition of the importance and complexity of the program, the Department designated the Chemical Demilitarization Program as a Major Defense Acquisition Program (MDAP) (acquisition category 1D) on December 26, 1994. This designation transitioned management of the program to the Assistant Secretary of the Army (Research, Development and Acquisition). Effective March 28, 1995, the program manager for chemical demilitarization was formed, he is responsible for:

- The chemical stockpile disposal project.
- The chemical stockpile emergency preparedness. project.
- The non-stockpile chemical materiel project.
- The alternative technologies and approaches project.
- The cooperative threat reduction product team.

As a Major Defense Acquisition Program, the Chemical Demilitarization Program is subject to the same management scrutiny reserved for the Department's most complex acquisition programs. This allows us to address head-on the issue of cost and schedule while maintaining a safe and environmentally sound program. Under MDAP designation, OSD provides oversight to the program through a Defense Acquisition Board (DAB) process. Typically the entire program is scrutinized for progress, cost effectiveness, technological improvement and management controls. Our DAB process has also established Integrated Product Teams (or IPT's) to address various issues, such as, environmental permitting, chemical stockpile emergency preparedness program, expeditious contracting approaches, external affairs, and cost cutting measures.

COMPONENTS OF THE PROGRAM

The project manager for the *Chemical Stockpile Disposal Project* (CSDP) is responsible for the safe and efficient destruction of the United States' unitary chemical stockpile. He plans, manages, and coordinates all phases of the project. This includes design, construction, equipment acquisition and installation, training, systemization testing, operations, and closure of chemical disposal plants and the training facility. The PM also ensures that physical security, safety, and environmental requirements are identified; re in compliance with all directives and federal, state and local laws, and are integrated into the entire technical effort.

The *Chemical Stockpile Emergency Preparedness Project* (CSEPP) is a complementary effort to the Chemical Stockpile Disposal Program to enhance protection of the civilian population during storage and destruction of the United States's chemical weapons stockpile. The Army with the Federal Emergency Management Agency's (FEMA) assistance has the lead in the CSEPP to provide emergency response preparedness to the communities surrounding the eight disposal sites.

The *Non-Stockpile Chemical Materiel Project* (NSCMP) was established in 1991 to account for all Department of Defense chemical warfare-related materiel destruction. The NSCMP mission includes: identifying the magnitude of the nonstockpile program in terms of locations, types of agents and materiel, and quantities that require treatment; developing and implementing transportation and destruction procedures; supporting ratified chemical treaties; and developing and implementing schedule and cost estimates. Non-stockpile chemical materiel includes: existing recovered chemical warfare materiel and that which may be received from burial sites, binary munitions and related components, miscellaneous chemical warfare materiel stipulated in the chemical weapons convention, and former chemical weapons production facilities.

The *alternate technologies and approaches project* is based on the Army's evaluation of the National Research Council Report "recommendations for the disposal of chemical agents and munitions". Several technological enhancements and/or changes are occurring in parallel with the Army's reverse assembly/incineration (baseline program). In August 1994, the Army initiated an aggressive research and development program on two low-temperature, low-pressure alternative technologies (chemical neutralization as stand-alone and chemical neutralization followed by biodegradation of the neutralized agent). These technologies are being explored for potential use at low-volume bulk-only sites. Additional promising alternative technologies are also being explored. Our effort is on track for a Department of Defense decision during the 1st quarter fiscal year 1997 to determine which alternative technology, if any, will proceed to pilot testing.

PROGRAM ACCOMPLISHMENTS-HIGHLIGHTS

The first prototype fully integrated disposal plant, the *Johnston Atoll Chemical Disposal System* (JCADS) on Johnston Atoll, has demonstrated full scale disposal operations in compliance with safety and environmental requirements for over 4 years of operational testing under rigorous independent evaluation. The JACADS has successfully destroyed over 1000 tons of agent. All M55 (nerve agent) rockets, all MAC–1 (Air Force) and all MK–94 (Navy) chemical bombs have been destroyed. The remaining 155mm nerve agent artillery projectiles are scheduled for destruction completion by fiscal year 2000. Many lessons learned have emerged from this pioneering disposal plant and will be used to enhance the environmental compliance, safety and operational efficiency of the United States destruction plants. Construction of the first disposal facility in the continental United States, the *Tooele Chemical Agent Disposal Facility* (TOCDF) at Tooele, UT, was completed in July 1993. Agent destruction operations are scheduled to start 3rd quarter fiscal year 1996. Recently, Ms. Sherri Goodwin, Mr. Gil Decker and myself, met with the State of Utah's Director of Environmental Quality and State Science advisor. We mapped out a consensus to finish the required environmental permits, so that Tooele can begin operations by the 3d quarter of this year. In addition, Mr. Decker and myself recently met with Utah county commissioners, reference better CSEPP support. We resolved outstanding requirements needed to ensure safety to surrounding communities at Tooele.

A contract for construction and operation of the *Anniston Chemical Agent Disposal Facility* (ANCDF) was recently awarded, with a "limited notice to proceed provision", to Westinghouse Electric Company. Construction activities well not commence until issuance of the necessary environmental permits. All required environmental permits are expected to be approved in 4Q fiscal year 1996.

FISCAL YEAR 1997 BUDGET REQUEST

Our program is a national program which needs the support of the Congress and the American people to get the job done. Toward this end, our fiscal year 1997 budget request contains approximately $800 million in the Chemical Agents and Munitions Destruction, Defense (CAMD, D) account. Of this amount, approximately $49 million is for research, development and testing support; $274 million for procurement requirements, and $478 million for operations and maintenance. In addition, we are requesting $132 million in the military construction account.

The fiscal year 1997 budget provides full funding for the CSDP to meet the congressionally directed 2004 completion date. Requested procurement funds will allow equipment acquisition and installation for Anniston, Umatilla, Pine Bluff, Pueblo, and Blue Grass Facility, plus design services for Anniston thru Newport facilities. Research and development funds will allow the continued development of alternative technologies and approaches (to incineration of chemical agents) for potential use at select chemical agent storage facilities. Operation and maintenance funds for program management will allow, technical support; operations at the JACADS and TOCDF; pre-systemization and training activities for Anniston, Umatilla, and Pine Bluff; and munitions reconfiguration operations at Anniston and Pueblo. Operations and maintenance funds well also support the chemical stockpile emergency preparedness program, to acquire personnel protection and communications systems and operate/sustain existing operations centers, systems, and training/testing programs. Funds are requested to support the non-stockpile chemical materiel program for management/planning and limited implementation activities to support CWC mission requirements and the development, testing, and procurement of temporary storage and treatment systems to support on site destruction of recovered chemical warfare materiel. Treatment systems include the rapid response systems and munitions management devices.

The fiscal year 1997 military construction budget provides for construction of disposal facilities at: Umatilla Chemical Activity (2nd increment), Pine Bluff, Arkansas (2nd increment) and the Pueblo Chemical Activity (1st increment).

SUMMARY

I wish to emphasize that we share the same goal as the Congress, to safely destroy the chemical weapons stockpile while providing maximum protection to the public, the work force and the environment. We appreciate the support and commitment of the Congress to the program. To accomplish our mutual goal, focus must be placed on staying the course and competing this critical mission of disposing of the chemical warfare materiel.

Senator LOTT. Dr. Stansberry.

STATEMENT OF KENT STANSBERRY, PH.D., DEPUTY DIRECTOR, ARMS CONTROL IMPLEMENTATION AND COMPLIANCE, OFFICE OF THE UNDER SECRETARY OF DEFENSE FOR ACQUISITION AND TECHNOLOGY

Dr. STANSBERRY. Thank you, Mr. Chairman. I have a prepared statement that I will submit, and I would like to summarize that briefly.

I am going to talk about the arms control funding proposal. Before I do that, I would like to talk briefly about organizational issues for arms control implementation and compliance with the Department of Defense. The Secretary of Defense has designated that the Under Secretary for Acquisition and Technology be responsible for oversight of all arms control implementation and compliance within the Department. I am responsible, under him, for oversight of the arms control budget, and that is the reason I am here today.

That oversight activity goes back to the early seventies, at the time the ABM Treaty entered into force. Currently, the assistant to the Secretary of Defense for Nuclear, Chemical and Biological Defense Programs has direct oversight for the nuclear, chemical and biological arms control areas. The Director for Strategic and Tactical Systems has oversight for strategic and conventional arms control areas.

This division, while it separates arms control implementation and compliance for management purposes, does have the benefit of assuring that the individual responsible for oversight of particular programs also have responsibility for oversight of the corresponding arms control. In addition, the On-Site Inspection Agency is under the administrative responsibility of the Under Secretary for Acquisition and Technology. That agency is responsible for conducting all U.S. inspections and continuous monitoring at specific facilities, and responsibility for escorting the inspectors of other countries during on-site inspections of U.S. facilities.

Finally, Under Secretary for Acquisition and Technology is responsible for developing technologies and systems used for verification purposes, such as on-site inspection. Most of that work is done by the Defense Nuclear Agency. Some of it is done by the Advanced Research Project Agency.

I would like to turn now to discussion of the administration's proposal for arms control. The planning for implementation covers a number of treaties and agreements, and deals with five different components of the Department. The Army, the Navy, the Air Force, the Defense Nuclear Agency, and the On-Site Inspection Agency. The proposed fiscal year 1997 DOD budget for arms control activities is approximately $282 million. This is about $16 million more than was requested last year, largely because of implementation planning costs associated with the Chemical Weapons Convention and the Comprehensive Test Ban Treaty (CTBT).

The services continue to plan and prepare for implementation in consolidated, department-wide program elements, and our budget for the services for fiscal year 1997 is approximately $144 million. The On-Site Inspection Agency has a budget for fiscal year 1997 of $112 million. The Defense Nuclear Agency has a proposed budget for fiscal year 1997 of $26 million.

Now, I would like to turn briefly to discuss the way we are spending money in different specific treaty areas. CFE, the Conventional Armed Forces in Europe Treaty, entered into force in 1992. We anticipate that we will be subjected to about 40 inspections annually throughout the life of the Treaty. The services and OSIA have budgeted about $17 million for fiscal year 1997 for that activity.

The Open Skies Treaty has yet to be ratified by all its participating states. After that ratification, we would move to implementation. The United States completed ratification in December of 1993. For planning purposes, we now are expecting Open Skies to enter into force January of 1997, and have budgeted for fiscal year 1997 $14 million for support of that Treaty.

The INF Treaty, limiting intermediate range nuclear forces, entered into force in June of 1988. We and all the other parties to the Treaty have eliminated all the treaty-limited items that were called for elimination in that. There is still continuous perimeter portal monitoring going on at an Alliant Tech System plant in Magna, UT, and at a former SS–20 assembly and production facility in Votkinsk. We have planned $23 million for implementation of the INF Treaty.

The START I Treaty entered into force, as Dr. Koch said, in December of 1994. To date, we have conducted 114 on-site inspections in the parties of the former Soviet Union. Their inspectors have conducted 57 on-site inspections at U.S. facilities under START. For fiscal year 1997, we are proposing $63.5 million to support START I.

START II has not entered into force yet. The Senate consented to ratification of that. We are awaiting ratification in Russia. Currently, we are planning, for planning purposes, that the Treaty enter into force in June of 1996. The services and OSIA have budgeted $14 million to prepare for START II.

The ABM Treaty, which has been in force since October of 1972, does not call for any budgeting in the arms control account for fiscal year 1997.

The Comprehensive Test Ban Treaty is currently in its final stages of negotiation. Our expectation is that it will be concluded June of this year and be opened up for signature at the United Nations General Assembly this coming fall. For planning purposes, we are planning on that approach and have budgeted approximately $27 million for support of CTBT.

The Chemical Weapons Convention, which is currently before the Senate for advice and consent to ratification, was signed in January of 1995. For planning purposes, we expect that the Chemical

Weapons Convention would enter into force March of 1997, about a year from now. In addition to the Chemical Weapons Convention, there is a bilateral destruction agreement between the United States and the states of the former Soviet Union, reached in 1990. Between the two of those things, the Chemical Weapons Convention and the biological destruction agreement, we are budgeting $78 million for fiscal year 1997.

The last page of my prepared statement, which I believe you all have a copy of, attempts to summarize in three different ways our proposed budget. The proposed budget totals $282 million roughly. There is a table in there which summarizes it by treaty area. It summarizes it by category of appropriations and summarizes it by DOD component.

That is all of my opening remarks, Mr. Chairman.

[The prepared statement of Dr. Stansberry follows:]

Prepared Statement by Dr. Kent G. Stansberry

Mr. Chairman and members of the committee, it is an honor and a pleasure to have the opportunity to appear before you today. I plan to discuss arms control compliance and implementation matters in the Department of Defense with an emphasis on the proposed funding for that activity. In particular, I will address three general topics: (1) the arms control responsibilities for implementation and compliance within the Department; (2) the proposed DOD budget for fiscal year 1997 to carry out implementation and compliance; and (3) the status of DOD planning for implementation and compliance for the various treaties and other agreements affecting DOD activities.

RESPONSIBILITIES WITHIN DOD

The Secretary of Defense directed that the Under Secretary of Defense for Acquisition and Technology (USD(A&T)) be responsible for oversight of arms control implementation and compliance for the Department of Defense. Managing that activity is a team effort, and we have established various organizations to provide an integrated management approach to the arms control implementation and compliance process. The Office of the USD(A&T) has a wide range of arms control responsibilities that are central to this integrated approach, including responsibility for overseeing DOD implementation of arms control agreements, ensuring compliance of DOD programs with existing arms control obligations, and overseeing DOD funding for arms control activities. Within the Office my responsibilities include oversight of DOD arms control funding; that is the reason I am appearing before you today.

The Office of the USD(A&T) has a long history of responsibility for DOD arms control implementation and compliance, dating back to when the Anti-Ballistic Missile (ABM) Treaty entered into force in 1972. At that time, the Director of Defense Research and Engineering was assigned responsibility to oversee overall DOD compliance for the ABM Treaty and SALT I Interim Agreement. Management responsibilities have evolved over time. Currently, the Assistant to the Secretary of Defense for Nuclear, Chemical and Biological Defense Programs (ATSD(NCB)) has these responsibilities for nuclear, chemical, and biological arms control; this includes the Comprehensive Test Ban Treaty, the Chemical Weapons Convention, and the Biological Weapons Convention. The Director, Strategic and Tactical Systems within the Office of the USD(A&T) has these responsibilities for strategic and conventional arms control; this includes the ABM Treaty, the INF Treaty, the START I Treaty, the START II Treaty, the CFE Treaty, and the Open Skies Treaty. This division of the arms control responsibility ensures that within the Office of the USD(A&T) those individuals responsible for oversight of particular areas of Defense programs are also responsible for the corresponding areas of arms control.

For all arms control treaties and agreements, USD(A&T) is responsible for ensuring that the Military Services and Defense Agencies plan, program, and budget for implementation. This entails, in part, (1) overseeing implementation planning and execution throughout the Department of Defense; (2) ensuring that adequate plans are developed for conducting eliminations, inspections (including security measures, appropriate contracting with industry facilities, etc.), notifications, and for all other DOD compliance obligations; (3) ensuring, in coordination with Under Secretary of Defense for Policy (USD(P)), the Comptroller, and the Director, Program Analysis and Evaluation, that DOD elements plan for, budget, and allocate resources to implement and comply with Treaty provisions; (4) providing an interface with DOD contractors potentially impacted by inspections to minimize adverse implications; and (5) providing coordinated guidance on DOD arms control implementation and compliance issues. The specific responsibilities of USD(A&T), as well as the responsibilities of the Military Services and Defense Agencies, are detailed in DOD Directive 2060.1, which was issued on July 31, 1992 (a copy of this Directive is attached).

The On-Site Inspection Agency (OSIA) comes under the administrative authority and responsibility of the USD(A&T). OSIA was established within the Department of Defense by the President and reports to the USD(A&T) through the ATSD(NCB). It receives policy guidance and tasking from the rest of the Administration through the Office of the Secretary of Defense. Within the Department, the OSIA Executive Committee (EXCOM) provides oversight, policy, and technical guidance to OSIA. The USD(A&T) chairs the EXCOM; the other members are the USD(P) and the Chairman, Joint Chiefs of Staff. OSIA is responsible for conducting all U.S. inspections and continuous monitoring at specific facilities in other countries and for escorting inspectors of other treaty parties during on-site inspections of U.S. facilities.

The USD(A&T) is also responsible for developing technologies and systems for arms control implementation, including on-site inspections. In this regard, the USD(A&T) provides guidance to and directs the Military Services and Defense Agencies, including the Defense Nuclear Agency (DNA) and the Advanced Research Projects Agency (ARPA) who execute technology programs in this area.

ARMS CONTROL BUDGET

The DOD arms control budget supports planning for the implementation of a number of Treaties and agreements by five DOD components: the three Military Services, the DNA, and the OSIA.

The proposed fiscal year 1997 DOD budget for arms control activities is approximately $282 million. This year's budget is about $16 million more than was requested in fiscal year 1996 due largely to the implementation planning costs associated with the Chemical Weapons Convention (CWC) and the Comprehensive Test Ban Treaty (CTBT). Funding for CTBT was previously identified in other programs throughout the fiscal year 1996 budget, but is in the process of being consolidated within the Air Force arms control program.

The services continue to plan, prepare for, and implement arms control treaties and agreements within consolidated program elements. Their efforts total approximately $144 million of the overall $282 million dollar DOD arms control budget.

The OSIA coordinates and conducts on-site inspections and continuous monitoring at specified facilities overseas, escorts foreign inspection teams, and coordinates continuous monitoring activities at U.S. facilities. Other OSIA responsibilities include training and equipping U.S. inspection and escort teams. The President's budget for fiscal year 1997 contains $112 million for OSIA activities.

DNA conducts research and development programs in support of compliance, verification, and monitoring requirements. The general goal of these programs is to provide effective and timely technical support and equipment for on-site and aerial inspection to verify arms control treaties and agreements and to assist the U.S. Government in implementing and complying with them. The fiscal year 1997 arms control related budget request for DNA is approximately $26 million.

STATUS OF PLANNING FOR THE VARIOUS TREATIES AND AGREEMENTS

The Conventional Armed Forces in Europe Treaty (CFE) entered into force in 1992. Since then, the United States has completed its entire reduction obligation through the destruction of 643 tanks and artillery pieces, and the transfer of 2810 pieces of equipment to NATO partners who correspondingly destroyed their own outdated equipment. The United States anticipates being subjected to 40 inspections annually throughout the life of the Treaty. The services and OSIA have budgeted approximately $17 million in support of CFE. Included in this figure are inspection/evaluation and military facility/formation visits associated with the Vienna Document 94.

Implementation of the Open Skies Treaty is pending entry into force following ratification by three other participating states. The United States completed ratification in December 1993. The Treaty is expected to enter into force by January 1997. We are preparing to conduct the treaty-required certification of the first fully operational U.S. OC–135 aircraft as soon as the Treaty enters into force. A second WC–135 aircraft is being modified to become operational later this year to permit the US to implement the full rights accorded under the Treaty. The initial operational aircraft, while continuing to be used for training, will be modified to support actual Open Skies missions, if required. The DOD Open Skies budget $14 million in fiscal year 1997. This prepares for the following:

- During full implementation of the Treaty, it is anticipated the number of annual flights will be less than the maximum allowed by the Treaty (42). For budgeting purposes, the Department has planned, after full implementation, to conduct 22 annual Open Skies observations and to be subjected to 22 annual observations.
- The United States will conduct training missions in addition to Treaty observations throughout the life of the Treaty. These missions include U.S.-only dress rehearsals and foreign joint training missions, as required.

The Intermediate-range Nuclear Forces (INF) Treaty entered into force in June 1988. All INF Treaty-limited-items were eliminated by both Parties before the deadline of May 31, 1991. Continuous portal/perimeter monitoring of facilities where ballistic missiles subject to INF were once produced and/or assembled continues at Hercules Plant #1 in Magna, Utah, and at the former-SS–20 final assembly facility in Votkinsk, Russia. Since entry into force of the START I Treaty on December 5, 1994, Russia's Votkinsk former-SS–20/current SS–25 final assembly facility has exited items subject to inspection under both INF and START I. OSIA budgets for (a) 15 INF "quota" U.S. on-site inspections (OSIs) on the territory of the Former Soviet Union (FSU), (b) U.S. continuous portal/perimeter monitoring at Votkinsk, and (c) escort activities related to FSU annual "quota" OSIs on U.S. and Allied territory and the continuous monitoring site in Magna, Utah. From June 1, 1996, to the end of the INF inspection regime on May 31, 2001, the total number of permitted annual "quota" OSIs will decrease to 10. The DOD budget supporting INF totals approximately $23 million in fiscal year 1997. Reimbursement of Inspection Costs made in accordance with a Policy Statement by the United States has amounted to $65,839.00 for the period December 1, 1994 to November 30, 1995.

The START I Treaty entered into force on December 5, 1994. The extensive START I baseline inspections were completed on schedule, and the parties have begun the second full year of treaty implementation. To date, the United States has conducted 114 on-site inspections at FSU START declared facilities, as well as escorted FSU inspectors during the 57 on-site inspections conducted at U.S. declared facilities. Significant reductions in the U.S. deployed strategic forces have already been completed, and reductions are proceeding on schedule to meet START limits on deployed strategic offensive arms. The DOD fiscal year 1997 budget submission in support of START is approximately $63.5 million. Payments associated with reimbursement of inspection costs to Belarus, Kazakhstan, and Ukraine in accordance with the Joint Compliance and Inspection Commission Statement of Policy concerning Reimbursement of Inspection Costs, February 3, 1994, have amounted to approximately $208 thousand for the period January 1, 1995 through December 31, 1995. Funding for future such reimbursements is contained in the OSIA budget submission for fiscal year 1997. These inspections are expected to decrease now that the baseline inspection period is over.

Planning for START II Treaty implementation began prior to the signature of the Treaty in order to ensure full compliance at entry into force. In November 1992, DOD guidance directed that all Military Services and Defense Agencies begin planning for START II and assigned specific implementation responsibilities. For planning purposes, the Treaty is expected to enter into force by June 1996. The Military Services and OSIA have budgeted approximately $14 million to prepare for implementation of START II. The majority of these costs are for Navy procurement of long-lead items associated with reentry vehicle downloading and OSIA funding necessary under START II.

The ABM Treaty entered into force in October 1972. There are no requirements for arms control funding to implement the ABM Treaty in fiscal year 1997.

With the recent push from the President, the U.N. Secretary General and others, negotiations that began on the CTBT in January 1994 in Geneva have entered the end game where final compromises are reached and the Treaty text is finalized. The negotiations are expected to conclude in June of this year, and open for signature at the U.N. General Assembly in the Fall. Preparations for the CTBT are under way in the Department, with existing programs being consolidated under streamlined management. In December 1995, the Deputy Secretary of Defense directed the appointment of a new Deputy for Nuclear Treaty Programs within OATSD(NCB) who is responsible for coordinating and managing CTBT implementation and compliance planning, preparation and program execution. Approximately $27 million in funds from existing programs have been consolidated into the Air Force arms control program element to support the continued preparation for support of the CTBT.

The Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and their Destruction, commonly called the Chemical Weapons Convention (CWC), was concluded and opened for signature in Paris on January 13, 1995. The United States was one of the original signatories. For planning purposes, we expect the CWC to enter into force by March 1997. A preparatory Commission, made up of signatory States, was established in The Hague to carry out necessary preparations for implementation of the CWC. The agreement between the United States and the Union of Soviet Socialist Republics on Destruction and Non-Production of Chemical Weapons and on Measures to Facilitate the Multilateral Convention on Banning Chemical Weapons, commonly called the Bilateral Destruction Agreement (BDA), was signed on 1 June 1990. The United States and Russia concluded (ad ref) update and implementation protocols for the BDA in March 1993. The Army and supporting DOD agencies, such as DNA and OSIA, are committing significant resources toward execution of this program. The DOD arms control budget contains nearly $78 million in direct support of the CWC and BDA planning, preparation, and implementation.

BUDGET SUMMARY

The following table summarizes the DOD arms control budget for fiscal year 1997 in three difference ways: by treaty, by DOD component, and by category of appropriation.

Fiscal Year 1997 DOD Arms Control Budget

Treaty:	*Amount*
	Amount
CFE	17.021
CW	77.830
INF	23.024
Open Skies	14.118
NTT (CTBT & TTBT)	30.617
START I	63.529
START II	14.381
BW	2.400
Other	13.217
Verification Technology	26.199
Total	282.336
DOD Component:	
RDT&E	52.985
O&M	211.018
Procurement	18.333
Total	282.336
Category of Appropriation:	
Air Force	56.324
Army	37.255
Navy	50.242
DNA	26.199
OSIA	112.316
Total	282.336

CONCLUSION

Mr. Chairman and members of the committee, I appreciate your interest in DOD implementation and compliance for arms control. I am happy at this time to answer any questions you may have about these matters.

Senator LOTT. The chart is very helpful.

Dr. Stansberry, you do have a line there, I just noticed, over $13 million in the arms control account identified as "other." I would like for you to provide for the record exactly what that other provides for.

Dr. STANSBERRY. I will do that, Mr. Chairman.

Senator LOTT. All right, sir.

[The information referred to follows:]

"OTHER" ARMS CONTROL FUNDS

Funding in the *Other* category ($13.217 million) reflected in the fiscal year 1997 DOD Arms Control Budget includes On-Site Inspection Agency funding ($5.746 million) for costs associated with Safeguards, Transparency, Irreversibility and Plutonium Agreements (STI), Vienna Document 1994 Confidence and Security Building Measures (CSBM), United Nations Special Commission (UNSCOAO on Iraq, Defense Treaty Inspection Readiness Program CDTERP), Technical Equipment Inspection (TEI), and Bosnia Peace Plan/Dayton Agreement support; and Navy ($3.912 million) and Air Force ($3.559) funds for headquarters administrative and oversight efforts within those services that span multiple treaties as well as funding for analysis of emerging arms control issues.

A more complete breakdown follows:

OSIA: STI: $2.693M—Funds OSIA participation for 14 inspections and 8 escort activities and other cooperative measures to increase confidence in declarations of Plutonium and Highly Enriched Uranium (HEU) reserves, increase confidence that weapons components are secure and increase confidence that fissile materials declared excess are not being used to build new nuclear weapons. Entry-into-force is for these agreements is expected in the third quarter fiscal year 1996.

CSBMS: $0.250M—Funds OSIA participation in required inspections and evaluations.

UNSCOM: $1.607M—Funds OSIA's role as the Department of Defense Executive Agent responsible for planning and coordinating operations with appropriate Federal agencies concerning matters of interest to the United Nations Special Commission on Iraq.

DTIRP: $0.549M—Funds OSIA's role as Executive Agent of this program which provides service to government and industry in support of site preparation for treaty imposed inspections.

TEI: $0.137M—Supports OSIAs responsibility as the central manager for maintaining and employing technical inspection equipment.

Bosnia: $0.510M—Funds OSIA's role in inspector training and participation in inspections under the auspices of the Organization for Security and Cooperation in Europe (OSCE).

Navy: $3.912M—Funds administration costs ($1.519M) associated compliance and implementation activities for CW, INF, Open Skies and the Certain Conventional Weapons Convention; and the costs ($2.393M) for assessing impacts of arms control on Navy/USMC facilities, programs and operations; treaty text review and analysis to establish Department of the Navy obligations; support of emerging treaties and agreements; and unique program security assessments.

Air Force: $3.559M—Funds implementation and compliance activities on several treaties to include Open Skies, CWC, INF, CTBT, Certain Conventional Weapons Convention, Bilateral Destruction Agreement, and the Biological Weapons Convention ($0.649M). Funds administrative, travel and facilities costs associated with arms control negotiations ($0.500M). Funds analysis of Air Staff issues that will impact and influence future negotiations and agreements; START II early deactivation examination; and the impact of force structure changes on existing treaties ($1.810M). Also: funds database support for all arms control negotiation, compliance and implementation issues—tracking and coordination ($0.600M).

Senator LOTT. Dr. Stansberry, to date, can you explain how the reimbursement agreement between DOD and Ukraine and Belarus and Kazakhstan works and how much of it has been reimbursed to these republics to date?

Dr. STANSBERRY. When both the START I and INF Treaties were reached, there was the expectation that both parties would pay their own costs incurred for on-site inspections. When the Soviet Union broke up, we entered a situation where Ukraine, Kazakhstan and Belarus, as now independent states, did not anticipate to carry out inspections—or very few inspections—in the United States, but we were going to inspect facilities on their territory substantially.

As a policy commitment by the United States, we are paying what otherwise would be their costs incurred when the United States goes there to inspect. We do not pay those costs if any of those countries send inspection teams here. So this is only a circumstance where we inspect on their territory—they do not inspect on ours—we will reimburse the costs to them of our inspections—the costs that they would normally incur. We report twice annually, I believe it is——

Senator LOTT. On the costs?

Dr. STANSBERRY. The costs. The most recent was in a letter from Dr. Hal Smith to Chairman Thurmond, dated March 11 of this year, just 3 weeks ago, providing the costs for 1996. I can provide a copy of the letter for you right now.

Senator LOTT. That is all right. If you would just provide a copy of the letter that has that information, just so we will have some idea of how it is working and what kind of money we are talking about.

Dr. STANSBERRY. Okay.

[The information referred to follows:]

Memorandum from Harold P. Smith, Assistant to the Secretary of Defense Nuclear, Chemical, and Biological Matters, March 11, 1996, with enclosure to Chairman, Committee on the Armed Services.

ASSISTANT TO THE SECRETARY OF DEFENSE,
3050 DEFENSE PENTAGON,
Washington, DC, March 11, 1996.

Hon. STROM THURMOND,
Chairman, Committee on Armed Services,
United States Senate, Washington, DC.

DEAR MR. CHAIRMAN: I'm writing to update you on the status of the inspected party reimbursement costs associated with implementation of the Treaty on the Reduction and Limitation of Strategic Offensive Arms (START) and the Treaty on the Elimination of Intermediate-Range and Shorter Range-Missiles (INF). These reimbursement are identified in the START Joint Compliance and Inspection Commission Statement of Policy Concerning Reimbursement of Inspection Costs and the INF Statement of Policy on Reimbursement of Inspection Costs and Annex VII to the Memorandum of Agreement.

This letter notifies the appropriate congressional committees regarding the use of fiscal year 1995 funds to reimburse our treaty partners (i.e., Belarus, Kazakhstan, and Ukraine) for inspected party costs incurred during fiscal year 1995 inspections. START and INF fiscal year 1995 reimbursement costs not covered in my 24 October, 1995 Memo (same subject) are included in the enclosure.

Sincerely,

HAROLD P. SMITH, JR.

Enclosure.
cc: Hon. Sam Nunn,
Ranking Democrat.

NOTIFICATION OF INSPECTED PARTY COST REIMBURSEMENT FOR START

BACKGROUND

This reimbursement is made in accordance with the START Joint Compliance and Inspection Commission (JCIC) Statement of Policy by the United States of America concerning Reimbursement of Inspection Costs, February 3, 1995.

Belarus, Kazakhstan and Ukraine have fulfilled their obligations under this JCIC agreement and the On-Site Inspection Agency is prepared to reimburse them for inspected party costs associated with START inspections. As defined in the Statement of Policy, costs categories include: "meals, lodging, work space, transportation, and as necessary, medical care for the inspection team and aircrew members of the United States of America, parking and security protection for the inspection aircraft at the point of entry, and transportation of monitors at the point of entry."

INSPECTION PERIODS/REIMBURSEMENT

Bills associated with START are paid on a 6-month treaty cycle as outlined below.

Treaty billing period	Billed	Payment
Jan-Jun	NLT 31 Aug	NLT 30 Sep
Jul-Dec	NLT 28/29 Feb	NLT 30/31 Mar

Reimbursements for the payment period are outlined below:

	Inspections	Payment for inspections conducted 1 July 95–31 Dec. 95 (fiscal year funds)/total
Belarus	No Inspections	
Kazakhstan	15–18 Jul 95, 12–14 Aug 95, 8–12 Dec 95	(34,504)/$49,044
Ukraine	21–21 Sep 95, 8–11 Oct, 16–19 Nov 95, 10–15 Dec 95	(13,588)/$41,846
Payment period total	7 Inspections	(48,092)/$90,890

NOTIFICATIONS

Senate Notification	House Notification
Committee on Appropriations	Committee on Natl. Security
Subcommittee on Foreign Operations	Committee on International Relations
Subcommittee on Defense	Committee on Appropriations
Committee on Foreign Relations	Subcommittee on Foreign Operations
Committee on the Armed Services	Subcommittee on Natl. Security

Enclosure.

NOTIFICATION OF INSPECTED PARTY COST REIMBURSEMENT FOR INF

BACKGROUND

This reimbursement is made in accordance with the Statement of Policy by the United States of America concerning Reimbursement of Inspection Costs and Annex VII of the Memorandum of Agreement (MOU) of the Treaty on the Elimination of Intermediate-Range and Shorter Range-Missiles (INF).

Belarus, Kazakhstan and Ukraine have fulfilled their obligations under this agreement and the On-Site Inspection Agency is prepared to reimburse them for inspected party costs associated with INF inspections. Costs categories include: "meals, lodging, work space, transportation, and as necessary, medical care for the inspection team and aircrew members of the United States of America, parking and security protection for the inspection aircraft at the point of entry, and transportation of monitors at the point of entry."

INSPECTION PERIODS/REIMBURSEMENT

Bills associated with INF are paid on a 6-month treaty cycle as outlined below:

Treaty period	Billed	Payment
Jun–Nov	NLT 31 Jan	NLT 30 days after receipt of bill
Dec–May	NLT 31 Jul	NLT 30 days after receipt of bill

Reimbursements for the current period are outlined below:

	Inspections	Reimbursement for inspections 1 Jun 95–30 Nov 95 (fiscal year funds)/total
Belarus	7–14 Jul 95	($4,517)
Kazakhstan[1]	12–14 Oct 95	$8,638
Ukraine	None	
Total	2 Inspections	($4,517)/$13,155

[1] Higher costs per inspection are associated with the requirement to use airlift rather than ground transportation to make treaty timeliness.

NOTIFICATIONS

Senate Notification	House Notification
Committee on Appropriations	Committee on Natl. Security
Subcommittee on Foreign Operations	Committee on International Relations
Subcommittee on Defense	Committee on Appropriations
Committee on Foreign Relations	Subcommittee on Foreign Operations
Committee on the Armed Services	Subcommittee on Natl. Security

Enclosure.

Dr. STANSBERRY. Just to summarize, for the period which covers January to December of calendar year 1995, for START, we reimbursed about $90,000, and for INF, about $13,000 in all three of those countries.

Senator LOTT. I understand, Dr. Stansberry, that 1996 arms control implementation funds are being used to implement the conventional arms agreement in the Dayton Agreement. I was wondering what authority is the Department operating under in using these funds, and how much is being used to implement the Dayton Agreement?

Dr. STANSBERRY. On February 29th of this year, the Secretary of Defense authorized the On-Site Inspection Agency to support the Dayton Accord in Bosnia. They are doing such things as supporting inspections, providing training and support to the Organization for Security and Cooperation in Europe in their lead role in those activities. That is being done using On-Site Inspection Agency funds out of their operations and maintenance account.

Those funds have been available for this year because of the slippage, primarily, of the Chemical Weapons Treaty entry into force. They had budgeted for that Treaty a substantial amount for fiscal year 1996, for this fiscal year, and the Treaty entry into force has been delayed, compared to our planning assumptions. So there is additional money available.

They expect, however, only to use about $1.4 million for this fiscal year. They have put in a separate item in the budget of about a half-a-million dollars for the budget you now have in front of you.

Senator LOTT. All right. I am not sure exactly which one of you I should ask this, but I think maybe you, Dr. Prociv. I want to follow up on Senator Nunn's comments about his hearings on the potential use of chemical or biological agents in the United States.

The Senate has included a provision in the defense bill for the past 3 years requiring DOD and DOE to report to Congress on its plans to respond to terrorism use of chemical, biological or radiological agents in the United States. I do not know that anything has been done on that. Can you give me the status of that report?

Dr. PROCIV. I can speak for the report that was in last year's report language. The responsibility for that went to policy, a group titled EP, Emergency Preparedness. They are in the process of writing that report. I have seen the outline. That report is due to Congress, I believe, on April 18th of this year. I really cannot speak for the prior year, Senator.

Senator LOTT. I think, based on the hearings that I had heard about that Senator Nunn has been having, and the concerns we legitimately have there and what happened in Japan, we really need to give some serious thought to that.

Dr. PROCIV. I agree. We are giving it a serious look.

Senator LOTT. Dr. Prociv, the Chemical Demilitarization Program has grown from about $1.2 billion in 1985 to $12 billion-plus program, a growth of about $1 billion a year. Can you explain the causes for this rather significant increase over that period of time?

Dr. PROCIV. Yes, sir, Mr. Chairman. The program is a very unique program. There is not another one like it in the United States. We have spent considerable time and effort in making sure that we bring along all interested parties. The majority of the growth that has occurred, has occurred because we had not, in the early days, anticipated changes in environmental regulations, responses to public concerns, items such as this. We have gone to great pains to make sure that we are good citizens in those communities, and are now communicating with those individuals. The major costs have grown in areas where we had little engineering control.

Senator LOTT. I remember several years ago we had to remove Agent Orange from a Seabee base in Gulfport, Mississippi—get it by rail from the base, out to the port, on an incineration ship, and take it out to sea, in the Gulf, and incinerate it. Obviously, there have been some significant technologies that are being worked on since that. That took place, I guess, about 10 years ago.

Dr. PROCIV. Yes, sir.

Senator LOTT. But when do you anticipate knowing whether this neutralization technology will work to destroy the chemical agent? Do you have any timetable on that?

Dr. PROCIV. The neutralization technology, as I mentioned is part of an alternative technologies program. We are looking at that predominantly because there are some bulk sites that we have got, Aberdeen, Maryland, and Newport, Indiana, which do not have explosives and really, we believe, do not necessarily need the incinerator. The incineration process really was designed for munitions that contain chemical agents. Where we have both, we are looking at alternatives.

So we believe that sometime in the near future we will get a clear answer. We have run an internal competition and an external competition in industry. We have come down with five approaches. The NRC is currently evaluating those approaches. They will come back to us at the end of August and recommend which of those to go forward with. We will look at the timetable at that point.

Going from a bench scale to a pilot scale, or even from an industrial process to a full-up process, takes some time. We have to meet all the applicable regulations. Also we have to satisfy the public.

Senator LOTT. That is certainly sometime a problem, the resistance that you meet from various groups and the media. But under the Chemical Weapons Convention, I believe that we are obligated to destroy unitary and non-stockpile weapons agents within 10 years of entry into force, with a possible 5-year extension. With all the hoops you have to jump through and the problems you are going to certainly, I guess, encounter, can you be ready to meet this 15-year time frame?

Dr. PROCIV. Yes, Mr. Chairman. We have started on this. We have a considerably head start. We originally did not start the destruction program because of the Treaty; it was mandated by Congress. The DOD had these weapons. Their shelf life had expired. They essentially were not even part of our operational interest anymore. So we went ahead and started a program well before the Treaty considerations.

We feel confident that, barring any other unforeseen circumstances, that we can make the 2004 deadline.

Senator LOTT. I believe my time has expired.

Senator Exon.

Senator EXON. Thank you, Mr. Chairman. Thank you very much.

I would like to talk to Dr. Koch, if I might. Dr. Koch, I am aware of the Russian sensitivities and the lack of cooperation in at least some of the areas that you have been working with them on, on the CTR program. Some argue that, in the face of the Russian resistance, no amount of U.S. assistance through CTR or other programs will have a significant impact. Is this true? How obstructive have you found the Russians to be in this area?

Dr. KOCH. In the first place, I do not believe it is true. By and large, we have found considerable cooperation from the Russians. It does vary according to project. The cooperation with the Center for Defense Industry on Strategic Offensive Arms Elimination has been excellent. So, too, has the cooperation with the Ministry of Defense on weapons protection, control and accounting for safe and secure transportation and storage of weapons. Cooperation with the Ministry of Atomic Energy has been more mixed.

One of the highest-priority projects in that regard is the long-term fissile material storage facility at Mayak, which was one of our first projects, and went far too slowly. However, we, within the last year, developed very precise milestones for the project, to make certain that it got underway and was completed expeditiously. We have seen, in recent months, very real progress in that regard. So that construction is happening at Mayak. We hope the design will soon be complete. We are going to have a contractor on the site.

So while the picture of cooperation may be somewhat mixed, the vast majority of the projects are running very smoothly.

Senator EXON. It is fair to say, then, that what we have heard emanating from the Russians from time to time may be part of the nationalistic movement but, if I understand you correctly, you are saying the people that are really doing the work on this, generally, are as understanding as we are and are as dedicated to carrying it out; is that a fair statement?

Dr. KOCH. That is absolutely true.

Senator EXON. Dr. Prociv, if the Chemical Weapons Convention Treaty enters into force, the U.S., of course, will be faced with essentially two separate deadlines for completion of the chemical weapons destruction process, one from the CWC Treaty and the other from Congress. At the same time, opponents of the planned Chemical Demilitarization Program are taking every legal step today to delay or even terminate the program. This sounds to me like a good description of the fact that we might find ourselves between a rock and a hard place.

If delays in start-up continue, at what point in time, during what future year, will the remaining time be too short to meet the demilitarization deadline?

Dr. PROCIV. Yes, sir, Senator Exon. We feel very confident we could meet the 2004 statutory deadline at this point. We have taken some steps to make sure that we can do that. We have, in fact, started a much more proactive public outreach campaign. We determined that public outreach was a contact sport, and we needed to get out and actually physically talk to the people. That is myself, General Wharton and Mr. Decker have been out to talk to the communities. It is paying off some dividends.

We recently had a letter from the Calhoun County, Alabama Chamber of Commerce, endorsing our incineration approach, and saying to get on with it. Recently, in creating our public outreach office in Umatilla, the mayor of the city there and the associated mayors in the local communities got up and said, We endorse this process, get on with it.

I think we are making tremendous strides on the public side, and I think the detractors of our process are also losing a little bit of ground here.

Senator EXON. Dr. Prociv, thank you.

I would like to turn, if I could, for a moment—and I think you would be the one to answer this question—I understand that the first demilitarization facility at Johnston Island has already completed the destruction of about half of the stockpile that we have there. When do you expect project completion of the destruction of chemical weapons on the island? How well has the plant itself performed? Has it been both safe and a reliable operation?

Dr. PROCIV. Yes, sir, Senator. We feel very happy with the performance of Johnston Island. It was serial number 1, so we had to take out a lot of bugs and learn a lot of lessons in that. At this point, we are processing weapons through there at a much greater rate than we had anticipated. If in fact we can continue that rate and translate those lessons learned to the U.S. facilities, we should be able to reduce the budget substantially without any sacrifice in health and safety.

We believe we have had a very safe operation. The one or two incidents that we have had have been totally contained by the engineering controls that we placed to preclude any kind of escape on those incidents. So we feel very comfortable that Johnston Island was a success.

Senator EXON. Dr. Koch, will you tell us, as briefly as you can, the status of the compliance with the CFE treaty, which nations are not yet in full compliance with the Treaty and what actions we plan to take in this regard?

Dr. KOCH. Overall, the compliance record with the CFE Treaty is very successful, from the standpoint of meeting the overall reduction requirements by last November on schedule. There has been elimination of more than 50,000 items of treaty-limited equipment pursued under the Treaty.

The major compliance issue is that of the flanks, where both Russia and Ukraine are not yet in compliance with the Treaty provisions on flank limitations. But we are working very closely with Russia and with our allies and the other CFE partners to arrive at a satisfactory resolution of that issue that would not change the Treaty obligation for Russia at all.

That same overall approach would apply to Ukraine and resolve the Ukraine problem as well.

Senator EXON. Is the same thing generally true with regard to other treaties, aside and apart from the CFE Treaty?

Dr. KOCH. For an overall record of compliance, by and large, that is true. The record for START, as I mentioned in my opening statement, is very good indeed. We continue to have concerns about Russia's fulfillment of its commitments under the Biological Weapons Convention and the bilateral chemical weapons agreements, and we are continuing to work those very hard.

Senator EXON. I thank the panel very much.

My time is up, Mr. Chairman.

Senator LOTT. Senator Nunn.

Senator NUNN. Thank you very much, Mr. Chairman.

Dr. Koch, there have been a lot of people who have written friendly articles in terms of praising the CTR program, and there have been some, most recently, an article or two that were very critical. I would like to take the critical side today and just ask you a few questions and get your response to some of that criticism, so we will have an understanding of what DOD's position is on it.

Dr. Perry refers to the CTR program, or the Nunn-Lugar program, as "Defense by other means." How do you answer those who complain that every dollar that the CTR program spends in the former Soviet Union is a dollar taken from the U.S. military and from critical U.S. defense programs?

Dr. KOCH. I would say it is a dollar spent for the purposes of critical U.S. national security requirements and at a bargain price. That rather than deterring or defending against weapons of mass destruction from the former Soviet Union, we are assuring their elimination. That is very, very much threat reduction, and very much in our interest.

Senator NUNN. Can you give us an example of how the threat against the United States has been decreased because of the Nunn-Lugar program?

Dr. KOCH. When the Soviet Union broke up, we were very concerned that four successor states with nuclear weapons on their soil would attempt to maintain those nuclear weapons indefinitely. The CTR program has played a very major part in persuading those states to implement their commitment to become non-nuclear and in assisting the actual transportation process.

I believe, in 1992, there were approximately 3,400 strategic warheads in Ukraine, Belarus and Kazakhstan. The number now is slightly over 300, and falling rapidly.

Senator NUNN. The other criticism that needs answering, in my view, is that the CTR program is freeing up the Russian defense establishment to pursue their own offensive programs and even including nefarious programs such as the war in Chechnya. How do you respond to the claim that this money is really allowing them to do things that they would not be able to do if it were not for the Nunn-Lugar program, in terms of building systems and also pursuing conflict in their own country?

Dr. KOCH. The activities on the Russian side are so different that I think it would be very difficult to argue that the funds on their side, the effort, is particularly fungible. But, in any case, the reduction of Russian weapons of mass destruction is so completely in our interest that our cooperation with Russia in accelerating those reductions is most worthwhile.

Senator NUNN. Do you think that there would have been no war in Chechnya if there had been no Nunn-Lugar program?

Dr. KOCH. Certainly not. I am afraid that the conflict in Chechnya follows its own dynamic, its own rationale, which is completely separate from our activities in the CTR program.

Senator NUNN. Dr. Koch, some critics have pointed to the fact that the Russians have a new ICBM in development as a kind of proof that the CTR program is helping them build new systems and threaten us. My understanding is that for years and years and years—and I have been through most of this—that what we wanted to do is move the Russians off of their MIRVed ICBM's toward the single-warhead ICBM. Was not that one of the main objectives of the START II Treaty? As they move away from their MIRV systems to single-warhead systems, is not that in our national security interests?

Dr. KOCH. Absolutely, Senator. The main goal of the START II Treaty is to eliminate heavy and other MIRVed ICBM's. A Russian program to continue production of a single-warhead ICBM is entirely consistent with START II. If the choice confronting us is between Russian production of a new single-warhead ICBM or the production of new MIRV's, then our interests certainly lie in channelling those efforts toward single-warhead ICBM's and eliminating the MIRV's.

Senator NUNN. Back in the 1970's and mid-1980's, we would almost have been willing to pay for their single-warhead ICBM's if they would get rid of the MIRV's, would we not?

Dr. KOCH. That may well be true. That may well be true.

Senator NUNN. I notice you refer only to Russia, Ukraine, Belarus, and Kazakhstan. My understanding is the legislation we passed indicates that CTR assistance could be eligible for other states that are not part of the four nuclear states. Why does DOD interpret this as narrowly as it does? Our hearing showed, for instance, that the main potential danger of leakage of nuclear materials and so forth would probably be from southern Russia rather than heading westward. Yet most of our efforts seem to be in those areas. Do you interpret the CTR program as barring you from giving any assistance to the Caucasus states and others?

Dr. KOCH. No, Senator. We have certified only the four, Russia, Ukraine, Belarus, and Kazakhstan, because that is where we thought the need was greatest to fulfill the purposes of the CTR program, their existing capabilities for weapons of mass destruction. But the legislation certainly does not prohibit certification of another former Soviet state and making it eligible for it.

Senator NUNN. If you decided that there was a real payoff for United States security in giving export or border control assistance or something of that nature, even though it may be carried out by Customs or some other agency, do you believe that the CTR program, legally speaking, is broad enough to give DOD that discretion?

Dr. KOCH. I would expect so, as long as the state is certified.

Senator NUNN. I think that you are going to have to look at that. I think that maybe you ought to look at law enforcement, too. But our impression is, when you look at the map and you see southern Russia and you see the Iranian situation and you see Afghanistan and you see a lot of other parts of the globe that have potential dangers and potential terrorist groups, it seems to me that we need to take a closer look at that.

Mr. Chairman, I think I have had my notice here.

Senator LOTT. Senator Bingaman.

Senator BINGAMAN. Thank you very much, Mr. Chairman.

I wanted to ask you about the laboratory-to-laboratory program that the Department of Energy, I think, is involved with, with our nuclear weapons laboratories. How does that fit into your overall activities, and what do you see as the value of that?

Dr. KOCH. We think it is very valuable, indeed, and we work closely with the Department of Energy on their program. Initially, much of the U.S. Government activity in assistance to the former Soviet Union on fissile material protection, control and accounting was funded by the CTR program. However, given the Department of Energy's greater expertise, the program, if you will, has spun off to the Department of Energy. That has happened with some other CTR programs, where we were able to start a program in CTR and, as it grew, spun it off to agencies with greater expertise in the area.

But there is a great synergy between DOE's efforts on fissile material protection, control and accounting and our efforts on weapons protection, control and accounting and our program on long-term storage of fissile material. So that they each attack discrete and necessary elements of the overall problem.

Senator BINGAMAN. This fissile material storage facility that we are trying to help construct near Chelyabinsk, could you tell me your view as to the importance of that? Is that central to what we are trying to get accomplished there as you see it?

Dr. KOCH. Yes, it is a very important project. Because as the warhead dismantlement process continues and accelerates, it does result in large quantities of fissile material. The Government has a multi-pronged approach dealing with those quantities of fissile material, to guard against potential proliferation or other dangers.

One is our contract to buy 500 metric tons of highly enriched uranium over time. But much of the material, and particularly plutonium, pending resolution of another means to dispose of plutonium, must be stored. So the long-term storage facility is critical from the safety, security and nonproliferation standpoint, to keep the warhead dismantlement process going.

Senator BINGAMAN. The Congress is evidently planning to try to add several billions of dollars to the defense budget this year. I know that the budget that you have submitted assumed, of course, the President's bottom line as far as the total defense budget. If there was additional money available for the types of activities that you are pursuing, which area do you think would be the most important to dedicate that money to? Do you think that there is a need or a valuable effort that could be made in a particular area if you did have additional resources?

Dr. KOCH. No, Senator. We have planned our budget request, the programs underlying our budget request for fiscal year 1997, quite carefully. We believe that that is the request to address the most important activities to fit into our longer-term CTR program plan.

Senator BINGAMAN. Is there anything you are doing to keep nuclear scientists and engineers in Russia busy? Are any of the funds that you have responsibility for going to that? I know Mr. Soros, I think, had a major program to try to maintain some type of employment activity for Russian nuclear scientists, as I understood it. I think that has run out or is running out this year. Is there anything that we are doing with public money along those lines, or should we be?

Dr. KOCH. We are. The International Science and Technology Center in Russia. The Science and Technology Center in Ukraine, its sister center, if you will, was another program that began in 1992 under the Nunn-Lugar CTR program. Both are now primarily funded for the United States by the State Department. They exist for precisely that purpose—to provide alternative peaceful employment for weapons scientists and engineers—and have garnered considerable non-U.S. funding, as well.

I should specify that the International Science and Technologies Centers are State Department managed and primarily State Department funded. There is still some CTR money.

Senator BINGAMAN. Okay. That is all I had, Mr. Chairman.

Senator LOTT. Senator Exon did have to leave, but he will have a couple of additional questions that he will ask you to respond to, or we will ask you to respond to, for the record.

Dr. Koch, following the line of questioning from Senator Nunn, I know that on the CTR program last year, there was information that came out that some of those funds perhaps were used for housing for former Soviet military officers and to reactivate dormant weapons plants. What is the status of those? Has that happened? Did it happen? Is it still happening? Are we allowing that sort of thing to occur?

Dr. KOCH. There have been CTR programs in Ukraine and in Russia to house demobilized Strategic Rocket Forces officers. Under Russian and Ukrainian law, the officers could not be let go from the Strategic Rocket Forces unless there were housing available. So we did consider the housing for, again, demobilized Strategic Rocket Force officers to be an important part of our effort to reduce the overall nuclear infrastructure in those states.

There has been no activity to reactivate dormant weapons plants as such. There has been activity to convert plants, firms, formerly involved in the production of weapons of mass destruction to peaceful activity, to both reduce any ongoing production of weapons of mass destruction and to end the incentive to return to that work or to seek WMD work in the future. The defense conversion programs under CTR, particularly through the Defense Enterprise Fund, have been to support joint ventures between U.S. firms and such firms in the four recipient countries.

Senator LOTT. The expenditure of CTR funds is contingent on the certification by the President that Russia and the other republics are in compliance with arms control agreements. Is Russia in compliance with its obligations under the Conventional Forces in Europe Treaty and START?

Dr. KOCH. The certification requirement is that the state involved be committed to comply with arms control agreements. Russia is, we believe, certainly in compliance with START. As I mentioned earlier, the CFE flank issue remains an outstanding one. However, in November, Russia, as well as all the CFE Treaty parties, agreed on the framework for a resolution of the CFE flank issue within the framework of the Treaty as it is written now. We are filling in the details of that framework. There is a clear path to compliance, and we believe a Russian commitment to comply.

Senator LOTT. START?

Dr. KOCH. Yes, and START definitely.

Senator LOTT. According to the *Washington Times* report in an article, I believe, in January, Secretary Perry confirmed that the U.S. was suspicious that Russia had conducted a nuclear test. Has the Department been able to determine whether Russia conducted the test? If there is a determination that a nuclear test was conducted, would the Department agree that it was not in compliance with either the recent nuclear test moratorium, the Nuclear Test Ban Treaty, and the Threshold Test Ban Treaty?

Dr. KOCH. Forgive me, Mr. Chairman, I do not feel qualified to answer. Perhaps I could take that for the record.

Senator LOTT. That would be fine. It is a sensitive and important question, and I hope you will take a look into it.

[The information referred to follows:]

The Department of Defense has not been able to determine whether Russia conducted a nuclear test last January. The Intelligence Community is completing a classified analysis of this issue. If the Russians had conducted a nuclear test last January, they would have done so without sending us required notifications in accordance with the Protocol to the Threshold Test Ban Treaty. In addition, the nuclear test would have ended their unilateral moratorium on nuclear testing.

Senator LOTT. Since I have already had one round of questions, and Senator Levin was out when I started asking the second round and he has not had a first round, we will yield to Senator Levin for questions.

Senator LEVIN. Mr. Chairman, thank you.

First, on some chemical issues, Dr. Prociv. What are the current estimates of costs to comply with the bilateral destruction agreement that is in force now? How much is it going to cost us to comply with the terms of that agreement?

Dr. PROCIV. I do not have those numbers. I am going to have to take that for the record. I do not believe we have those numbers here today.

Senator LEVIN. But our understanding is that the initial estimate was something like $8 billion, and with some of the environmental and the technical delays——

Dr. PROCIV. Oh, I am sorry.

Senator LEVIN. Pardon?

Dr. PROCIV. I am sorry, I misunderstood your question. I thought you were talking about the bilateral defense agreement, which was a treaty.

Senator LEVIN. The destruction agreement.

Dr. PROCIV. I am sorry, the bilateral destruction agreement. Are you talking about the U.S. program?

Senator LEVIN. Yes.

Dr. PROCIV. Yes, the current estimate for completion and destruction of all of our materiel is $12.4 billion.

Senator LEVIN. Now, that is what we are committed to already?

Dr. PROCIV. That is right.

Senator LEVIN. Now, if the Chemical Weapons Convention is ratified and we complete the destruction process according to its terms, what would be, or would there be, any additional costs above what we are already committed to?

Dr. PROCIV. In our program, in the Chemical Destruction Program, I do not believe there will be. We have accommodated all of the requirements of the convention, and we believe we can complete that within the restrictions of the convention.

Senator LEVIN. I want to be real clear on this, to make sure I understand it. We presently have a commitment under a bilateral destruction agreement, is that correct?

Dr. PROCIV. The bilateral destruction agreement, I do not believe is in effect, sir.

Senator LEVIN. All right. So we are not committed, then, now?

Dr. PROCIV. That is right.

Senator LEVIN. Under any bilateral agreement?

Dr. PROCIV. Our destruction program right now is a unilateral destruction program.

Senator LEVIN. Okay, that clarifies that.

Dr. Koch, in your testimony on page 4, you make reference to the ABM TMD demarcation issue. You indicated, about the middle of the page there, that our agreed framework approach to implementing these principles has two phases. In part one—I assume that means phase one—the sides would agree that lower-velocity TMD systems, those with interceptor velocities up to 3 kilometers per second comply with the Treaty, so long as they are not tested against ballistic missiles with more than a 3,500-kilometer range or 5-kilometers-per-second velocity.

Then you say that systems with higher interceptor velocities, including space-based TMD and TMD based on other physical principles would be addressed separately in part two. Then you say: However, we have made it clear to the Russians that we will make unilateral compliance determinations under the ABM Treaty while we undertake discussions on high-velocity systems. Then, at the end of that paragraph: The U.S. will not accept a demarcation agreement that limits our ability to field effective TMD systems.

Now, my question is this. There was some discussion here a few weeks on this precise point, and I want to make very clear at least what my understanding is of it. The Navy upper-tier system, as I understand it, is a higher-velocity TMD system, is that correct?

Dr. KOCH. That is correct, Senator.

Senator LEVIN. Okay. This framework agreement does not in any way, as I understand it, restrict our development of that Navy upper-tier system, is that correct?

Dr. KOCH. That is correct, Senator.

Senator LEVIN. The reason that that is correct is because while we have agreed as to what is in compliance with the Treaty, we have not yet agreed as to what is not in compliance with the Treaty, is that correct?

Dr. KOCH. That is correct, Senator.

Senator LEVIN. Okay. Until we agree as to what is not in compliance, we retained explicitly the right, and have so notified the Russians, to make unilateral determinations on that issue, is that correct?

Dr. KOCH. That is the case.

Senator LEVIN. Okay. Thank you.

Senator LOTT. That is very interesting.

Senator Thurmond, do you have any questions, sir?

Chairman THURMOND. Thank you, Mr. Chairman.

I just want to say that this is a very important subcommittee. The topics here that are being discussed and on which decisions will be made vitally affect our defense.

I thank the witnesses for coming. I want to commend the able chairman here and the members of the subcommittee for the great job they are doing.

Thank you very much.

Senator LOTT. Thank you, Mr. Chairman, for coming by.

Do you want some more time?

Senator LEVIN. I am all set. Thank you.

Senator LOTT. Let me just ask one question, Dr. Koch. In answer to questions from Senator Bingaman, you indicated that you had asked for the funds you needed and the funds that you need have been included in the administration request. Was that not your response? Is that accurate?

Dr. KOCH. That is true, Mr. Chairman.

Senator LOTT. Well, I think that is important. Because there are proponents of the CTR program, for instance, that would like an increase, a substantial increase, and they would like less constraints or requirements. So, given the record of obligating funds, I mean at some time it is difficult to obligate even the funds you have. I think you have indicated by your response, then that you do not think that an increase in funding is necessary in that program this year?

Dr. KOCH. That is correct, Mr. Chairman.

Senator LOTT. Okay. I believe there are no further questions. I want to thank the witnesses for coming. It has been very interesting and enlightening testimony. We appreciate it very much.

[The prepared statement of Mr. Kevin R. McDonald follows:]

PREPARED STATEMENT BY KEVIN R. MCDONALD, PRESIDENT AND CHIEF EXECUTIVE OFFICER DEFENSE ENTERPRISE FUND

Mr. Chairman and Members of the committee: As President and Chief Executive Officer of the Defense Enterprise Fund ("DEF"), I appreciate the opportunity to submit testimony today on the Defense Enterprise Fund's operations in support of the U.S. Department of Defense Cooperative Threat Reduction program for the former Soviet Union.

The Defense Enterprise Fund is a U.S. Government-funded, private venture capital fund that invests in joint ventures that convert defense-related enterprises in Russia, Ukraine, Kazakhstan, and Belarus to the production of civilian goods. The Fund began operations in September 1994 as part of the "Nunn-Lugar" program, after receiving its authorization and initial funds from the U.S. Congress pursuant to the National Defense Authorization Act and the Department of Defense Appropriations Act for Fiscal Year 1994.

Currently capitalized at close to $30[1] million, the Fund identifies potential defense conversion investment opportunities, lines up joint venture partners, mobilizes additional capital and invests in defense conversion ventures in the former Soviet Union. The Defense Enterprise Fund is the only fund in the New Independent States that focuses exclusively on defense conversion.

Mr. Chairman, the Defense Enterprise Fund's primary goal is to further the national security interests of the United States by promoting, through investment, the conversion of facilities in Russia, Ukraine, Kazakhstan and Belarus that had been involved in the production of weapons of mass destruction (nuclear, biological or chemical), components of such weapons, or their delivery systems. In addition, the Fund's investments help to prevent proliferation of weapons of mass destruction by employing Russian scientists and technicians at home in commercial ventures, preventing them from seeking to market their skills abroad.

The Defense Enterprise Fund is not a foreign aid program. It provides no assistance directly to countries of the former Soviet Union, or to defense enterprises, or individuals located there; nor does it provide assistance directly to U.S. or other Western companies. The DEF invests only in joint ventures. Further, every joint venture in which we invest involves a partner in the former Soviet Union that the U.S. Department of Defense, specifically, the Defense Nuclear Agency, has identified as a priority for conversion, in furtherance of the national security interests of the United States.

After one full year of operations, the DEF is delighted to report that our current investments are going well. Our pipeline is full with over $80 million in projects currently under consideration, and the interest in our operations is substantial as we continue to receive numerous inquires from U.S. companies in states all across the country who often see the DEF's involvement as crucial to making their proposed defense conversion joint venture a reality.

To date, the DEF Board of Directors has approved four joint ventures in Russia totaling $9.75 million. In each of these joint ventures a Western partner has placed capital and management into the venture; the majority of the venture is privately held; the DEF and the Western partner together hold at least 50 percent of the equity; and the DEF has leveraged U.S. taxpayer dollars effectively by attracting, on average, $5 in additional private capital for every $1 that the DEF invests. These projects effectuate defense conversion from nuclear submarnnes to excavators; components for Soviet military aircraft to environmental control systems for commercial aircraft; radar and control systems for nuclear weapons to power grid and glass vacuum tubes for commercial applications, and nuclear weapons R&D to log sterilization.

Although our four initial investments are all located in Russia, we continue to focus on attractive, proposed investments in Kazakhstan, Ukraine, and Belarus in the areas of software programming, telecommunications and other high technology investments. We expect to continue to diversify our portfolio regionally as the other republics of the former Soviet Union make additional strides towards privatization and economic reform.

Despite the repeated concerns about the politics of the region as the principal area of concern for foreign investors, the DEF has found that political concerns, legal obstacles, and the changing tax environment, although challenging, are in most cases not the primary roadblocks to making a defense conversion joint venture a success. On the contrary, the principal concerns for us are the same as for a venture capital fund that focuses exclusively on investing in the U.S. Namely, the existence of a strong management team; commitment by each of the partners of capital, assets and/or expertise to the venture; a concrete business plan; and a clear market for the envisioned product. One of the most difficult tasks we face is communicating to companies and entrepreneurs from both the West and the former Soviet Union, that a "great idea" is not all that it takes to attract the investment of our Fund.

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[1] The DEF has received $29.7, in the following tranches:

- $7.6 million in July, 1994
- $20 million in May, 1995
- $2 million in October, 1995.

We take very seriously our two-fold responsibility of (1) investing in defense conversion joint ventures, and (2) protecting the U.S. taxpayer by ensuring that the ventures in which we invest are economically feasible, and have the appropriate internal controls in place to guarantee that U.S. Government money is used only for the purposes for which it is intended. As we continue our operations, we look forward to building on our successful track record. We are committed to the furtherance of the national security interests of the United States in support of the Department of Defense's Cooperative Threat Reduction program for the former Soviet Union.

In conclusion, Mr. Chairman, we would like to convey that Secretary Perry has expressed strong support for our operations as being in the vital interest of the United States. In a letter dated September 21, 1995 he indicated:

> *"the DEF continues to be an important priority for the Department of Defense and our continuing Cooperative Threat Reduction program. While other programs help to dismantle existing weapons of mass destruction, only the DEF and defense conversion activities help us dismantle the ability to produce such weapons in the future . . . "*

We hope that the U.S. Congress and this Committee, which was so instrumental in the establishment and initial funding of the DEF, will continue to provide support of our operations in furtherance of these paramount goals.

Thank you for the opportunity to submit testimony, Mr. Chairman. The Defense Enterprise Fund will be happy to respond to any questions that you or the other members of the committee may have.

Senator LOTT. The subcommittee is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR TRENT LOTT

FUNDING FOR COOPERATIVE THREAT REDUCTION PROGRAM

Senator LOTT. Dr. Koch, since 1992, the Congress has either provided transfer authority or appropriations totalling $1.9 billion for the CTR program. I understand that the Department has proposed obligation of $1.2 billion of those funds.

How much of the $1.9 billion authorized or appropriated for the CTR program has been spent or obligated to date?

Dr. KOCH. From fiscal year 1992 to fiscal year 1996, the Department of Defense received $1.9 billion in authority for the CTR program. Of this $1.9 billion, $370 million was rescinded by Congress or expired before it could be obligated. As of November 18, 1996, notified funds for the entire CTR program totaled just over $1.53 1 billion, while obligated funds totaled just over $1.143 billion, representing over 74 percent of total obligation authority available.

What is the status of DOD's defense conversion program—the program where CTR funds were used to provide housing for former Soviet military officers and to reactive dormant weapons plants?

Dr. KOCH. DOD's defense conversion program in the Former Soviet Union has made a significant contribution toward U.S. threat reduction goals. In accordance with the FY96 National Defense Authorization Act, CTR is not funding any additional defense conversion efforts. The efforts previously funded, however, are nearing contract completion. Through the defense conversion industrial partnerships DOD has funded through contract awards to U.S. companies, approximately 120,000 square meters of floor space have been converted to the production of goods to assist civilian populations, and approximately 1,400 employees have been redirected from weapons of mass destruction work to civilian projects.

In Kazakstan, former military facilities are being used to produce valves and pressure vessels for cryogenic materials and gases, bottle vitamins, establish a national wireless telecommunications capability, and set up a production facility for printed circuit boards. In Ukraine, 261 houses for demobilized Strategic Rocket Forces officers and their families have been completed at Pervomaysk, and 195 apartments have been completed at Khmelnitsky. Approximately 400 additional apartments will be completed at Khmelnitsky in 1997. Industrial partnerships are underway to produce state-of-the-art instrumentation and control systems for Ukrainian nuclear, coal, and hydroelectric power plants to improve their operational safety, produce digital instrumentation and control hardware for nuclear and conventional power plants, manufacture die cast consumer products such as automotive parts and hand tools, and assemble then manufacture polyvinyl chloride windows and doors. In Russia, our defense conversion industrial partnerships have produced dental chairs, hearing aids, and prototypes of the Russian GPS navigation system and Traffic Collision Avoidance System. The industrial partnership to produce prefabricated housing for demobilized Russian officers and the Russian housing market is still in developmental stages. In Belarus, construction of up to 171 apartments for Strategic Rocket Forces officers at Grodno is expected to be complete in early 1997. Industrial partnerships have produced laser pointers and battery chargers.

The Defense Enterprise Fund (DEF) continues to pursue actively defense conversion-oriented investment opportunities. While the majority of its projects are in Russia, the DEF also is pursuing actively projects in Kazakstan. Thus far, Ukraine and Belarus have proven more difficult for the DEF, but potential projects from both countries also are in the DEF project "pipeline." Since DOD began funding the DEF 2 years ago, we have provided, through the CTR program, a total of $51.7 million. The DEF is expected to become self-sustaining by fiscal year 1998.

DOD's defense conversion efforts have been integral to the dismantlement and elimination of weapons of mass destruction and have reduced weapons production capability. Defense conversion assistance has provided incentives for states of the Former Soviet Union to move ahead with the elimination of these weapons, and has assisted these nations in addressing other aspects such as housing and re-training necessary to speed demobilization of Strategic Rocket Forces personnel. For these reasons, defense conversion has been of strategic importance to the United States, while providing substantial economic benefits and opportunities for U.S. companies.

ARMS CONTROL IMPLEMENTATION COMMISSIONS

Senator LOTT. Dr. Koch, I understand that you are here to testify about the CTR program, however, I have some concerns about how the arms control implementing commissions, such as the Joint Consultative Implementation Commission for START have been used by the administration to negotiate changes in the implementation of the treaty. As I understand it, the implementation commissions of the treaties are to be used by the parties to deal with implementation questions.

I believe that the commissions are being used by the administration to make substantive changes to the treaties. Bottom line, the Senate gave its advice and consent to ratification of arms control treaties based on representation by the administration that certain obligations would be met by the signatories.

If an arms control treaty allows treaty signatories to conduct on site inspections for verification purposes, that it would be a violation of the obligation if one party would not let the other party conduct the inspection? In responding to this question, could you use as an example the disagreement between the United States and Ukraine over portal monitoring at Pavlograd.

Dr. KOCH. Refusal to allow a party to conduct a treaty-permitted inspection would generally be inconsistent with treaty obligations. There are limited exceptions, such as in the relatively rare case of *force majeure*.

Ukraine did not however, prevent the United States from establishing perimeter/portal continuous monitoring (PPCM) of the Pavlograd Machine Plant. The United States began to exercise PPCM at that plant in January 1995, as allowed under the START I Treaty. The United States and Ukraine disagreed over the, duration of the US PPCM right: Ukraine believed that it expired in May 1995 (because Ukraine informed us that production of SS–24 ICBMs ceased before entry into force of the Treaty), while the United States believed it expired in December 1995 (one year after Ukraine provided official notification under the Treaty that mobile ICBM production had ceased at that facility). After review of the issue, and without prejudice to the legal position of the United States, the United States concluded a policy arrangement with Ukraine to resolve the dispute. (Relevant Congressional committees, including the Senate Armed Services Committee, were notified of this policy arrangement before it was concluded.), Under the arrangement, the United States terminated its PPCM of the plant at the end of May 1995, in return for which the United States was allowed to conduct three short-notice inspections of the plant's interior between 1 June and 6 December 1995. These inspections enabled the United States to confirm that SS–24 production was no longer taking place, as declared by Ukraine. Since 6 December 1995, the Pavlograd facility has been subject to suspect site inspection (SSI) in accordance with START I; we conducted an SSI at the facility in August 1996.

CTR CASH GRANT TO UKRAINE

Senator LOTT. Dr. Koch, on March 19, DOD forwarded notification to the Congress that an agreement had been reached between the Ukrainian Ministry of Defense and DOD, for a cash grant of $10.3 million for removal of nuclear warheads and support equipment from Ukraine. Without reading the letter sent to the Committee, can you explain how this cash grant will assist Ukraine to complete denuclearization on schedule? How many other cash grants have been made to anyone of the four nuclear republics?

Dr. KOCH. The grant to the Ministry of Defense of Ukraine was required to facilitate the final denuclearization of Ukraine, a paramount national security goal of the United States. The grant supported sensitive activities to include the removal of nuclear warheads and nuclear support equipment. Currently, it continues to support the defueling, removal from silos and partial neutralization of SS–19 missiles, as well as road repair and construction on sensitive areas of missile bases. In addition to this grant, one other prior grant was made to Ukraine in February 1995. This grant also supported the removal of nuclear warheads and related activities necessary for their safe and secure transport. All of these expenditures are non-recurring costs associated with the final removal of all warheads and related equipment from Ukraine.

The decision to provide these two pieces of CIR assistance to Ukraine in the form of a cash grant rather than through a U.S. contractor springs from three unique and important considerations. First, existing security agreements between Ukraine and Russia restrict access to nuclear weapons and related materials to Ukrainians with proper security clearances. This fact would complicate direct involvement by U.S. personnel and would preclude direct auditing of performance of any contracts awarded. Second, there are no provisions in the implementing agreement for the U.S. government or its contractors to handle the nuclear weapons or to have access to nuclear weapons handling equipment. Any U.S. contractor would be unable to secure commercial insurance coverage for this project, and the contractor would be forced to seek indemnification from the U.S. government under the Federal acquisition regulations. The granting of such indemnification would be highly unlikely. Third, relying on a contractor to carry out this work would only increase the price for performing the work. U.S. contractors would be forced to subcontract the work to the same Ukrainian Ministry of Defense firms already authorized and capable of performing the work. Thus, utilizing a U.S. contractor adds no value and only increases the price for their involvement. It should be noted that grant monies to Ukraine were not provided in one lump sum, but rather are spread out through partial payments in order to provide accountability and performance incentive, to reduce the overall risk of performance failure, and to ensure that the monies are used to cover work called for under the terms and conditions of the grant.

In sum, the use of cash grants to provide CTR assistance is extremely rare. Other than the two above-cited grants to Ukraine, DOD has not made cash grants to any other CTR recipient nation.

ARMS CONTROL COMPLIANCE AND CTR

Senator LOTT. Dr. Koch, expenditure of CTR funds is contingent on a certification by the President that Russia, and the other republics, are in compliance with arms control agreements. Is Russia in compliance with its obligations under the Conventional Forces in Europe (CFE) Treaty and with START?

Dr. KOCH. Russia is several years ahead of its reduction requirements under the START Treaty. With respect to the CFE Treaty, Russia has completed its declared CFE reduction obligations and is in compliance with the Treaty's limits except in a few instances which are primarily related to the unresolved Black Sea Fleet dispute with Ukraine and to the flank issue. However, the flank agreement reached at the CFE Review Conference in May 1996 provisionally provides Russia (and other parties) a grace period until 31 May 1999 to reach compliance with these limits. The United States has also raised with Russia in each treaty's compliance forum a number of concerns relating to Russian implementation activities. For more detailed information about these activities, I would refer you to the most recent Arms Control and Disarmament Agency Annual Report, which is submitted to Congress annually and contains a discussion on adherence to and compliance with arms control agreements. I would also note that in accordance with the Cooperative Threat Reduction Act of 1993, the President must certify to Congress annually that countries receiving Cooperative Threat Reduction assistance, such as Russia, are committed to comply with relevant arms control agreements. This certification includes a detailed discussion of Russia's compliance with START and CFE.

RUSSIAN NUCLEAR TEST

Senator LOTT. According to a *Washington Times* report in January, Secretary Perry confirmed that the United States was suspicious that Russia had conducted a nuclear test. Has the Department been able to determine whether Russia conducted a nuclear weapons test. If there is a determination that a nuclear test was conducted, would the department agree that it was not in compliance with either the recent nuclear test moratorium, the nuclear test ban treaty and the Threshold Test Ban Treaty?

Dr. KOCH. [Deleted].

BIOLOGICAL WEAPONS CONVENTION

Senator LOTT. The United States has had some lingering concerns about Russia's compliance with Its obligations under the Biological Weapons Convention. Have those concerns been resolved?

Dr. KOCH. U.S. concerns have not been fully resolved. Some former Soviet biological weapons research and production facilities are being deactivated and many have taken severe personnel and funding cuts. However, some facilities, in addition to being engaged in legitimate activity, may be maintaining the capability to produce biological warfare agents. We are continuing to work with Russia to resolve concerns about whether the offensive biological weapons program it inherited from the Soviet Union is continuing. Detailed information with respect to Russian compliance with the Biological Weapons Convention is provided in the annual report to Congress on "Adherence to and Compliance with Arms Control Agreements."

MORE FUNDING AND LESS

Senator LOTT. Dr. Koch, there are proponents of the program who believe that there should be an increase in the CTR fund, a substantial increase, and that there should be less constraints, or requirements, on obligating the funds.

Given the Department's record on obligating the funds that it currently has for the CTR program, do you believe it is necessary to increase funding for this program this year?

Dr. KOCH. We have a very clear sense of what we want to accomplish with the CTR program. This is embodied in the multiyear CTR Program Plan, a requirements-driven document supported by detailed individual project plans. Thus, the money we request annually is the money that we need to fulfill those plans. Plans change, of course, as we continue to work with the recipient states to identify new potential projects. With additional funding, we could expand assistance to support START II reductions, expand and speed the program to enhance security at Russian MOD storage facilities, and provide assistance to dismantle CW-specific capabilities of dual-use chemical production plants. Prior and present legislative restrictions on the CTR program have imposed a variety of limits on our assistance. Within those limits, we can assure you that our requests reflect the true needs of the program as currently planned. However, certain legislative restrictions such as congressionally-mandated budgetary subcaps and, beginning in fiscal year 1997, the "three-year funding" appropriations lifespan limit our ability to respond quickly and adequately to changing program needs. Greater legislative flexibility in these areas in the future would strengthen our capability to target CTR assistance where it is needed most, as warranted by future developments in the recipient countries.

GROWTH OF CHEM DEMIL BUDGET

Senator LOTT. Dr. Prociv, the chemical demilitarization program has grown from a $1.2 billion program in 1985 to a $12+ billion program—a growth of about $1 billion a year Can you explain the causes for this huge budget growth?

Dr. PROCIV. The life cycle cost of the chemical demilitarization program represents our best estimate of the expense of the complete program, from inception to conclusion. The estimate includes not only facility capital and operational costs, but also costs associated with National Environmental Policy Act and environmental permitting documentation, Chemical Stockpile Emergency Preparedness efforts, public involvement and review, and oversight by independent and government agencies (e.g., National Research Council, Department of Health and Human Services, Department of Defense Explosive Safety Board, the Surgeon General, and State Regulators).

The life cycle cost of the program has undergone significant revision as the program matured and activities were performed for the first time. Construction and operational costs have been revised based upon the experiences at Johnston Atoll. Sustained operations at our new destruction facility at Tooele, Utah will provide added assurances that modifications implemented there and included in designs for the follow-on facilities at other sites will have improved performance.

Our priority remains safety of personnel and the workforce and protection of the environment. Still, we are cognizant of the cost growth of the program over the past decade and we are concerned. We are now studying means by which those costs can be reduced without sacrificing safety or environmental protection.

Senator LOTT. Dr. Prociv, one of the viewgraphs provided to the staff indicated that a mission of the chem demil program is to support U.S. Government programs to assist other nations in eliminating their chemical warfare materiel. Exactly what kind of support are we providing other nations?

Dr. PROCIV. The only nation we are providing chemical demilitarization support to is Russia through the Cooperative Threat Reduction program. To date, $68 million has been made available under this program to support six distinct projects leading to the establishment of a Chemical Weapons Destruction Facility (CWDF). The projects are (1) a Chemical Weapons Destruction Support Office, (2) a Comprehensive Implementation Plan, (3) Joint Evaluation and Optimization, (4) Chemical Agent Analytical Monitoring, (5) Equipment/Process Scale-Up and Facility Design for the CWDF, and (6) Construction and Start-up of the pilot CWDF (pending specific authorization and funding by the Congress).

While no formal agreements with nations other than Russia have been completed, we are committed to share our expertise with other nations where appropriate. Japan, South Korea, Canada, Great Britain, and the Republic of Germany have been briefed on the U.S. Chemical Demilitarization Program and have been provided limited tours of our facilities.

ALTERNATIVE TECHNOLOGIES FOR DESTROYING THE CHEMICAL STOCKPILE

Senator LOTT. Dr. Prociv, what is the status of the alternative technologies program—when do you anticipate knowing whether the neutralization technology will work to destroy the chemical agent?

Dr. PROCIV. Research and development work at the Laboratory and bench scale has demonstrated that the neutralization (hydrolysis) process followed by a post treatment step can destroy chemical agents mustard and VX. The Army has performed these reactions in a 20 gallon reactor during bench scale experiments. The National Research Council (NRC) has reviewed the agent destruction data from this neutralization work, as well as data provided by three selected commercial vendors, and has recommended that the Army proceed with construction and operation of a neutralization pilot plant to demonstrate agent destruction in full-sized equipment.

The NRC completed its study of alternatives to incineration of chemicals at the bulk storage sites in October 1996. Its assessment was that the most effective technologies are aqueous neutralization followed by biodegradation for the mustard agent at Aberdeen, Maryland and neutralization of the nerve agent at Newport, Indiana with sodium hydroxide followed by off-site treatment and disposal of the hydrolysate. The Department of Defense is now studying this recommendation with the consideration of proceeding with construction of full-size pilot plants at Aberdeen and Newport.

CHEMICAL WEAPONS CONVENTION (CWC)

Senator LOTT. Dr. Prociv, under the Chemical Weapons Convention, the U.S. would be obligated to destroy its unitary and non-stockpile weapons and agents within 10 years of entry into force, with a possible 5 year extension. Given all the hoops that this program has to jump through to get a facility built, can the demil facilities be built and operational in time to meet this 15 year time frame?

Dr. PROCIV. Our goal for completion of the chemical demilitarization program is December 2004, as mandated by Public Law 99–145 with amendments and which is more than two years earlier than the destruction completion date required under the Chemical Weapons Convention. In a strictly technological sense, we are confident that the destruction of the chemical weapons can be completed by December 2004.

TRANSPORTATION OF THE CHEMICAL STOCKPILE

Senator LOTT. Dr. Prociv, last year Senators Brown and Nighthorse-Campbell included a provision in the Senate's defense bill that asked the department to look at alternative ways to reduce the overall cost of the program. One of those ways was the question about transportation of any portion of the stockpile. Is the Department considering alternate configurations, to include the possible transportation of portions of the stockpile as a means to reduce the programs overall cost?

Dr. PROCIV. The Department concluded in 1988 that transportation of the stockpile for destruction at a national site or at regional sites resulted in greater risk to the public than on-site destruction. This was the finding of the 1989 Final Programmatic Environmental Impact Statement (FPEIS). The Department of Defense is looking at all alternatives that can be legally considered if those methods can be at least risk-neutral and if there is an opportunity to reduce cost without jeopardizing safety or environmental protection. Correspondingly, we have begun a review of the fundamental assumptions contained in the 1989 FPEIS to determine if they remain true today. Our preliminary assessment tends to support the findings of the FPEIS: that on-site disposal of the lethal chemical stockpile remains the lower risk alternative. Some options do remain for destruction of non-lethal components such as dunnage, where commercial disposition is being evaluated in lieu of on-site treatment.

As you know, however, the Congress has not been receptive to the study of transportation of the chemical stockpile. The Fiscal Year 1997 DOD Appropriations Act, for example, states that "none of the funds . . . may be obligated for . . . transportation of stockpile assembled unitary chemical weapons or neutralized chemical agent to any of the eight chemical weapons storage sites within the continental United States."

ARMS CONTROL IMPLEMENTATION BUDGET

Senator LOTT. Dr. Stansberry, I understand that fiscal year 1996 arms control implementation funds are being used to implement the conventional arms agreement in the Dayton Agreement. Under what authority is the Department operating in using these funds?

Dr. STANSBERRY. The authority for OSIA's participation in this mission is a memorandum from the Secretary of Defense, Support for Bosnia Peace Agreement, 29 February 1996. The associated Executive Summary cites 10 U.S.C. 113 as authority for the SECDEF's tasking.

Of the funds requested in fiscal year 1997 for the arms control implementation budget, how much is to be used to implement the Dayton Agreement?

Dr. STANSBERRY. The budget estimate for fiscal year 1997 is $0.57 million for Dayton Agreement implementation.

POLICY AGREEMENTS TO REIMBURSE UKRAINE, BELARUS AND KAZAKHSTAN FOR INSPECTIONS

Senator LOTT. Dr. Stansberry, to date, can you explain how the reimbursement agreement between DOD and Ukraine, Belarus and Kazakhstan works. How much has been reimbursed to these republics to date?

Dr. STANSBERRY. This question was answered in previous letters to Congress. A copy of the most recent letter and all relevant previous enclosures are included for the record. The total amount spent as of March 29, 1996, is also attached.

UNITED NATIONS SPECIAL COMMISSION ON IRAQ

Senator LOTT. Dr. Prociv, what support does the Department of Defense provide to the U.N. Special Commission on Iraq, and how much does it cost per year?

Dr. PROCIV. DOD support to UNSCOM consists of providing technical experts (including travel costs), protective gear, detection equipment, and logistics support for inspection activities. Total DOD support to UNSCOM is capped at no more than $15 million annually, and has historically varied between $10 million and $15 million per year.

"OTHER ACCOUNT" IN ARMS CONTROL IMPLEMENTATION BUDGET

Senator LOTT. Dr. Stansberry, you have a line containing $13 million in the arms control account which is identified as "Other". For what purpose are these funds in this line?

Dr. STANSBERRY. This question was answered in a previous insert for the record. A copy of that response is provided for the record.

QUESTIONS SUBMITTED BY SENATOR SAM NUNN

Senator NUNN. Doesn't the U.S. assistance free up funds for Russia to modernize and improve its weapons, or to wage war against civilians in Chechnya, in fact subsidizing those programs, rather than forcing Russia and the other countries to spend their own money on dismantlement, as required by treaty commitments?

Dr. KOCH. The Russian defense infrastructure continues to carry out a variety of activities using their own resources. Some of these are limited by Russia's treaty and other commitments and others are independent of them. It is true, for example, that the Russians are carrying out nuclear modernization activities, which are in fact permitted under START. As two large and powerful countries, it is to be expected that sometimes US and Russian attitudes and interests will be in congruence and sometimes they will not. Our policies in Russia have been geared to what Secretary of Defense Perry calls a "Pragmatic Partnership": cooperation where our interests intersect and avoiding the Cold War's reflexive antagonism where our interests diverse. Our view is that Russia would have chosen most of its defense policy of recent years. including modernization, regardless of whether US supported their arms-control compliance decisions. Our Cooperative Threat Reduction (CTR) assistance helps ensure that these decisions are implemented and helps to expedite that implementation. We are assisting all four of these countries to expedite their implementation of START and other arms control treaties and commitments and to ensure the nuclear weapons free status of Ukraine, Belarus, and Kazakstan. These eliminations, carried out as quickly as possible. are in all of our interests, and our assistance makes them happen. If faced with a choice between treaty commitments and modernization, it seems at this point unlikely that Russia would forego the latter in favor of the former. We feel it is far better to be sure the treaty-limited systems are destroyed and removed from a threatening posture than to have them continue to exist while new weapons are brought on line.

Senator NUNN. Doesn't the slowness of the procurement process almost guarantee that any assistance that is provided is too little, too late?

Dr. KOCH. Silo launcher, SLBM launcher tube, and bomber eliminations are a very tangible example of assistance provided. While it is true that it took some time for both ourselves and our Kazakstani, Russian, Ukrainian, and Belarusian partners to learn how to work together and to jointly define requirements and develop projects, our obligation rates have gone up tremendously since the program's 1992 inception and we are now well on track. The completion of the fiscal year 1996 notification process, now begun. will bring our notifications to over $1.5B. More than $1B has been obligated already. Through this program, we are providing actual assistance. including equipment and expertise, that enable these countries to expedite meeting treaty obligations and, in the case of Belarus, Ukraine, and Kazakstan. fulfill their goals to be nuclear weapons free. Our procurement process is in line with government standards and regulations. as well as. of course, with our legislation. When required. we have been able to notify and obligate money very quickly, as in the case of the "Fast Aid" assistance for Ukraine SS–24 early deactivation in 1994.

Senator NUNN. How do we spend CTR funds in Russia, Ukraine, Belarus, Kazakstan?

Dr. KOCH. Through the CTR program, we provide a variety of assistance to Russia. Ukraine, Belarus, and Kazakstan to expedite the elimination of nuclear and other weapons of mass destruction in those countries in accordance with START and other treaties.

Russia: CTR Programs in Russia include Strategic Offensive Arms Elimination (SOAE) Emergency Response Training/Equipment; Fissile Material Storage Facility Design Assistance. Construction Support, and Construction and Facility Equipment; Fissile Material Containers: Security Enhancements for Nuclear Weapons Cargo and Guard Railcars; Nuclear Weapons Transportation Security; Nuclear Weapons Storage Security; Chemical Weapons Destruction: Defense Conversion, Arctic Nuclear Waste; Armored Blankets; and Defense and Military Contacts. CTR funds also contribute to the International Science and Technology Center (ISTC); Material Control, Accounting, and Physical Protection of nuclear weapons (MC&A); Export Control; the Defense Enterprise Fund, and the Research and Development Foundation. In Russia we assist in the elimination of SLBM Launchers, extraction and disposition of rocket propellant, silo launcher elimination, and a wide range of other programs. including considerable assistance to enhance security during storage and transportation of nuclear weapons components that are enroute to destruction and dismantlement.

Ukraine: In Ukraine. CTR programs include Strategic Nuclear Arms Elimination (SNAE); Nuclear Infrastructure Elimination (NIE); Defense Conversion; Government to Government Communications Link (GGCL)—now complete and operational; Emergency Response Training/Equipment; and Defense and Military Contacts. CTR funds also contribute to Export Control; Material Control, Accounting, and Physical Protection of Nuclear Weapons (MC&A); the Science and Technology Center; and the Multilateral Nuclear Safety Initiative. This past January, Dr. Perry, accompanied by Ukrainian and Russian Ministers of Defense Shmarov and Grachev, watched the final step in the destruction of the first silo eliminated with CTR funding.

Belarus: CTR Programs include Emergency Response Equipment and Training; Continuous Communications Link-now complete and operational; Expanded Defense and Military Contacts; Environmental Restoration; Defense Conversion; and Strategic Offensive Arms Elimination (SOAE) which will facilitate elimination of fixed structures associated with the SS25 mobile intercontinental ballistic missiles. CTR funds also contribute to Export Control; the Defense Enterprise Fund; the International Science and Technology Center (ISTC); and Material Control, Accounting and Physical Protection of Nuclear Weapons (MC&A). Additionally, under legislation separate and distinct from the Cooperative Threat Reduction Act, the Department of Defense signed a 12 August 1994 Agreement with the Belarus Ministry of Defense to provide equipment for the disposal of the remnants of dismantled conventional military equipment under a program known as Project PEACE.

Kazakstan: Programs include Strategic Offensive Arms Elimination (SOAE); Government to Government Communications Link (GGCL); Emergency Response Equipment and Training Expanded Defense and Military Contacts; Defense Conversion; and Nuclear Infrastructure Elimination (NIE). The NIE program includes a $7M project to assist Kazakstan in the elimination of infrastructure associated with nuclear weapons test tunnels at the former Soviet nuclear test site at Degelen Mountain. CTR funds also contribute to Export Control; Material Control; Accounting, and Physical Protection of nuclear weapons (MC&A); the Defense Enterprise Fund; and the International Science and Technology Center (ISTC). CTR funds helped pay for Project Sapphire. the purchase and delivery to the United States of 600 kg of highly enriched uranium from a Kazakstani production facility.

Senator NUNN. What have these funds concretely brought us?

Dr. KOCH. These funds have helped to dismantle nuclear weapons systems once targeted at us. They have helped ensure the safety and security of nuclear weapons during transport from operational sites to dismantlement sites, thus contributing to prevention of weapons proliferation. and they have helped Kazakstan to become nuclear-weapons free. With CTR assistance. over 800 former Soviet warheads have thus far been removed from operation and 800 missile launchers have been eliminated. Belarus and Ukraine will be nuclear-weapons free this year. As far as investments that the USG has made in this country's future go, this has one of the best returns imaginable. For a fraction of the costs of building deterrent weapons, we are instead securing safety by helping dismantle nuclear weapons systems previously aimed at us.

Senator NUNN. Russia may attempt to convince the West that without funding assistance, it will be unable to meet START II Treaty elimination requirements. Do we have plans to provide new assistance to support START II eliminations?

Dr. KOCH. Russia's START II costs will be reduced by CTR assistance already provided or planned to be provided. The U.S. has already provided $162 million in fiscal year 1992–1995 funds in assistance under the Strategic Offensive Arms Elimination (SOAE) program. All of this SOAE assistance can be used for START II as well as START I implementation. In addition we have currently planned or have under discussion up to $130 million in additional SOAE assistance to help with START II dismantlements. We will continue our ongoing dialogue with our Russian counterparts and will address for possible CTR SOAE assistance any new dismantlement requirements that they identify.

Senator NUNN. What is being done to safely store fissile material extracted from dismantled Russian nuclear weapons? In what way will the United States be able to ensure that Russia maintains proper control over this material?

Dr. KOCH. Under the CTR assistance program, the U.S. Department of Defense (DOD) is working with representatives of the Ministry of Atomic Energy of the Russian Federation (MINATOM) to ensure continued open cooperation between the two in the design, development, and construction of a safe, well-secured, and ecologically sound storage facility in which the stored fissile material extracted from dismantled nuclear weapons is centralized, and transparent to the United States. The United States has insisted that DOD and MINATOM cooperate in the development of a joint project step-by-step construction schedule with an executable milestone list. and with a firm funding commitment by the Russian Federation to support construction of the facility complex and a commitment to pay all infrastructure costs associated with it. U.S. design experts have been regularly meeting with MINATOM design experts at the VNIPIET Design Bureau to evaluate the design and to assist in the performance of engineering analyses. At a higher level, the DOD-MINATOM Joint Senior Implementing Group on the Fissile Material Storage Facility (JSIG) was established in 1994 to assess project status, review technical exchanges. address problems and delays, and jointly develop and monitor implementation of the construction schedule and milestone list. DOD has recently hired a Design and Construction Contractor to oversee U.S. assistance at the construction site, ensure construction management. and facilitate cooperation on the project. The United States will also participate in the design and development of the nuclear material control and accountability (MC&A) system for the storage facility, with the intention of having joint United States-Russian access to the data from the MC&A system. Finally, the United States also will exercise its right to audit and examine the use of CTR assistance in this project.

Senator NUNN. If more dollars were available for the CTR program, how would you use them?

Dr. KOCH. We have a very clear sense of what we want to accomplish with the CTR program. This is embodied in the multi-year CTR Program Plan, a requirements-driven document supported by detailed individual project plans. Thus, the money we request annually is the money that we need to fulfill those plans. Plans change, of course, as we continue to work with the recipient states to identify new potential projects, which can require us to change our planning and our funding requests, as can a variety of other developments both internal and external. For instance, with additional funding we could expand assistance to support START II reductions, expand and speed the program to enhance security at Russian MOD storage facilities, provide assistance to dismantle CW-specific capabilities of dual-use chemical production plants and support commercial partnerships with Western firms in the recipient states. Prior and present legislative restrictions on the CTR program have imposed a variety of limits on our assistance. Within those limits, we can assure you that our requests reflect the true needs of the program as currently planned.

QUESTIONS SUBMITTED BY SENATOR CARL LEVIN

CHEMICAL WEAPONS DEMILITARIZATION

Senator LEVIN. Dr. Prociv, Does Public Law 99–145 commit the U.S., by law, to destroy its unitary chemical weapons?

Dr. PROCIV. Public Law 99–145, also known as the Defense Authorization Act for Fiscal Year 1986, mandates the unilateral destruction of the U.S. unitary chemical weapons stockpile. The completion date, as modified by subsequent public laws, is December 2004.

Senator LEVIN. What is the current cost estimate for destruction of the unitary chemical weapons we are already committed by law to destroy?

Dr. PROCIV. The current estimate of life cycle costs to destroy the U.S. unitary chemical weapon stockpile is $12.4 billion. The Army is currently conducting a study to evaluate initiatives which will reduce the program cost without jeopardizing the health and safety of the public, the chemical demilitarization program work force, and the environment. The results of this study will be provided in the Department of Defense Budget Request for 1998.

Senator LEVIN. Assuming the Chemical Weapons Convention is ratified by the Senate and enters into force, what additional funding will be required to destroy the remainder of our chemical weapons and bring us into compliance with the Convention, and how long will it take?

Dr. PROCIV. The additional destruction which will be required by the Convention (i.e., binary chemical weapons, former production facilities, etc.), is estimated to cost $750 million. All destruction will be completed within the 10-year time frame required by the Convention.

ARMS CONTROL

Senator LEVIN. Is Russia's recent lack of aggressiveness in pursuing chemical disarmament necessarily indicate an intention to retain a chemical weapons capability or an intention to continue producing chemical weapons, or is there another explanation?

Dr. PROCIV. Presidents Clinton and Yeltsin agreed at their 1994 Summit on the need for universal adherence and application of Chemical Weapons Convention (CWC) provisions, as well as early entry into force of the CWC. Although the Russian leadership is committed to ratifying the CWC, Russian ratification presents significant economic, ecological, and domestic political problems. Nevertheless, the senior Russian leadership continues to express strong support for the CWC and is actively engaged in seeking solutions to Russian problems, including on the issue of destruction of Russia's chemical weapons stockpile. In this regard, some progress was achieved in 1995 and the Duma has indicated interest in taking up the CWC.

The Russians are watching closely the ratification process in the United States. Prompt U.S. ratification of the CWC would increase pressure on Moscow to follow suit. Russia is likely to want to participate in the political decision making bodies that will shape CWC implementation and to have its citizens serve on international inspections. It will want to avoid being subject to the restrictions on trade in certain dual-use chemicals which will apply to countries remaining outside the regime. Prompt Senate action will help spur Russian ratification.

It is in Russia's interest to fulfill its commitment to implement the CWC upon becoming a Party. We will, of course, monitor implementation of that commitment with every possible means.

Senator LEVIN. What are the advantages to the United States becoming one of the first 65 member states to ratify the Chemical Weapons Convention and becoming a member of the Preparatory Commission?

Dr. PROCIV. U.S. leadership was essential to completion of the CWC; it is again required if the CWC is to enter into force successfully and we are to begin a transparent and orderly process to eliminate stockpiles, stop production, and erect barriers against proliferation.

Our leadership is equally critical to the global fight against proliferation of all weapons of mass destruction. Countries working to stem proliferation look to the U.S. for signs of commitment and resolve; proliferators are emboldened if we hesitate. U.S. ratification of the CWC will confirm our continued leadership of this essential world-wide effort.

Without our leadership and participation, other countries, including Russia, would likely choose not to ratify the CWC. If this were to happen, chemical weapons stockpiles around the world would not be eliminated and might keep growing. There would be greater pressures in unstable regions to acquire chemical weapons.

If the CWC entered into force without the United States, we could not participate in the Organization for the Prohibition of Chemical Weapons (OPCW) or have U.S. citizens serve as inspectors on international inspections. The treaty also restricts trade with non-members in certain chemicals, many of which are important to U.S. industry. As a result, U.S. companies could be cut off from their traditional trading partners, which industry experts believe could brand the U.S. an unreliable supplier.

[Whereupon, at 12:25 p.m., the hearing was adjourned.]

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